THE VETERINARY JOURNAL

AND

Annals of Comparative Pathology.

MAY, 1894.

ON AN IMPROVED METHOD OF ADMINISTERING CHLOROFORM TO HORSES AND DOGS.

BY E WALLIS HOARE, F.R.C.V.S., CORK.

THE administration of anæsthetics in veterinary practice we must regard as yet being far from satisfactory, in relation to safety and to practical utility. Recent discussions will clearly demonstrate to us that we cannot hope at the present time to see the use of anæsthetics become general in veterinary surgery; nevertheless, the number of their advocates is gradually on the increase, while those who offer opposition have nothing new to support their contentions.

The method of administration which I now intend briefly to draw the attention of the profession to, is by no means original; but it will be directly opposed to the advocates of the Carlisle Inhaler. At the same time I must admit that although for surgical purposes, as well as in systematic experiments, I have clearly proved that the Carlisle Inhaler can be used with safety, still I have always thought that a system of excluding air from the animal was rather an irrational proceeding, and as it was always laid down that if air were allowed in administration to the horse, unsatisfactory results would ensue, I determined to investigate the matter, and am pleased to state that there is no necessity whatever for excluding air, and causing the animal to inhale the vapour of pure chloroform.

By the improved method, the chloroform vapour is mixed with a proportion of air, independently of the air admitted through the nose-bag; this is accomplished by means of a

foot bellows, which sends a current of air through an india-rubber tube to the bottle containing the chloroform, while another tube leads from this bottle to the nose-bag. The nose-bag is capacious, and fitted with air-holes underneath, which can be closed or opened at pleasure. By this method, of course, a longer time is required in the administration, but this is compensated for by the small amount of the drug used, the quicker return to consciousness, and the comparative safety of the animal. From 10 to 15 minutes will be the period occupied in administration, and from half an ounce to one ounce is the average amount of the drug required.

No hard and fast rule can be laid down with regard to either time or quantity, and this is not surprising when we consider the great diversity of phenomena which different horses exhibit to the action of narcotics, to which chloroform is not an exception.

Practical observation on all classes of horses, and for various operations, will demonstrate the peculiarities in the action of chloroform, and give valuable information for its safe administration.

By the method I have mentioned, in consequence of the chloroform vapour being properly diluted, there is practically very little preliminary struggling, none of the drug is wasted, and the amount administered is easily checked in the graduated bottle.

In considering the horse as a subject for the specific action of chloroform, I think we are justified in stating that his size, the capacity of the respiratory system, and the peculiar manner in which his nervous system is affected by the various narcotics, are important points in connection with the study of anæsthesia.

The vapour of the chloroform is received by the blood in the pulmonary capillaries, and requires to be carried to the central nervous system to produce its specific effect thereon.

As compared with the dog and man, it is clear that, on the one hand, it is possible for the horse, by a forced inspiration, to inhale a large amount of the chloroform vapour at one time; while, on the other hand, we have to take into consideration the large area of the pulmonary surface, and the distance between this and the central nervous system.

It is essential that a certain proportion of the chloroform vapour must be present in the blood circulating in the central nervous system before the specific effects are produced, *i.e.*, the depression of the nerve centres, and, as a result, the loss of perception and sensation.

We are well aware of the erratic manner in which horses are affected by many narcotics. Take, for example, opium. In one instance the soporific action predominates after a full dose; in another, cerebro-spinal excitement is the leading feature, and this is continued in exaggerated form even in repeated large doses of the drug. And so we must not be surprised that horses exhibit such different phenomena during the administration of chloroform.

The conclusions to be drawn from experimental research, as well as from observations made during the production of anæsthesia for surgical purposes, all tend to show that the drug should not be rapidly administered, so as to exclude air, and to compel the animal to inhale a large amount of undiluted chloroform vapour.

As previously stated, the method of administration I now advocate has the disadvantage of occupying a longer interval of time to produce anæsthesia, but this is amply compensated for in the greater safety to the animal. Those who have experience in the administration of chloroform to the horse by the Carlisle Inhaler, will notice that it frequently occurs, when the operation is completed, that the horse seems to go under a secondary stage of anæsthesia, even far more profound than the original stage, in some instances the respirations becoming shallow to an alarming degree. How are we to account for this circumstance? Having carefully studied this question, I have come to the conclusion that it is due to the chloroform having been too quickly administered, and in too large an amount at first, so as to induce a very rapid anæsthesia; there is too much of the agent in the blood, by reason of the administrator acting with undue haste in endeavouring to produce anæsthesia as quickly as possible, with the result that when the operation is completed there is still a large amount of the drug circulating in the blood, and continuing its specific action on the nervous centres.

There is not the slightest necessity for this undue haste in the administration, and I am perfectly convinced, as the result of experience in the method that I now practise, that by regulating the amount of the drug inhaled at first, and allowing a proper proportion of air, the proper stage of anæsthesia will be induced in a far more satisfactory and safer manner.

I have frequently drawn attention to the fact that the reflex action of the cornea is not to be depended on in the horse as a means of determining whether the proper stage of anæsthesia is reached or not. A horse will be perfectly

insensible to pain, and still have the power of moving the conjunctivæ.

During the operation of castration, especially in adult horses, it is frequently noticed that even when the proper stage of anæsthesia is reached, the animal will make an involuntary struggle when the incision is made in the scrotum.

But these involuntary movements are no indication of pain, and an interesting point to note is that in experiments conducted in destroying horses by means of chloroform, a short time prior to death there may occur involuntary movements of both fore and hind limbs.

When death from the administration of chloroform does occur during surgical operations in horses, it may be referred practically to two causes:—

1st. The existence of advanced cardiac disease, which circumstance may lead to a fatal termination, either by the occurrence of syncope, or such a debilitated condition of the circulation exists that the respiratory centre is paralysed with facility.

2nd. If the drug is administered in large quantities at one time, and a proper proportion of air not allowed, the administrator perhaps imagining that the horse is going under the influence too slowly, and he pushes the drug continuously; or perhaps the proper stage of anæsthesia is reached, and unaware of this the chloroform is still continued; then indeed we cannot be surprised if the respiratory centre becomes paralysed to a fatal extent.

In administering chloroform, we must recollect that our object is to render the patient insensible to pain, and that we do not desire the toxic effects of the drug.

There is no more necessity to give an overdose of it, than there is to administer an anodyne for the relief of abdominal pain in toxic doses.

In the latter case we commence by giving what we consider a proper dose to accomplish our object, and repeat it if necessary; and so it should be in the administration of an anæsthetic.

In short operations, it is only necessary to induce the primary stage of anæsthesia; in protracted operations the proper stage must be reached, and continued as long as may be necessary.

When once the system is under the influence of the drug, it only requires a very moderate amount to continue this action, and it is absolutely essential that an ample supply of air be

allowed. The character of the respiration is the only reliable guide as to the limits of safety.

In the production of anæsthesia in the dog, a small apparatus similar in principle to that used for the horse, acts in a very satisfactory manner.

This is worked by means of a Richardson's hand-bellows, and in the rubber tube is fixed a stop-cock which effectually regulates the supply of chloroform admitted with the air to the face-piece, which is made of canvas, with regulating air-holes underneath.

Both these apparatuses are made by Messrs Krohne and Sesemann, 8, Duke Street, Manchester Square, London, to whom I am indebted for very careful attention to all improvements suggested, and who first drew my attention to this method of administration.

At some future date, I propose to make some observations concerning the administration of chloroform to the dog, and its safe application in canine surgery.

In concluding these scattered remarks, I may say that it is indeed gratifying to notice the numerous advocates for anæsthetics, who, in spite of all opposition, maintain their views, and are not deterred from recording them. Another source of gratification is that our clients, in the great majority of instances, are in favour of the use of anæsthetics, more especially so when, after seeing them successfully employed, they become convinced of their utility, and also of the humane motives which justify the small amount of risk incurred.

The prejudices which still exist in the present day on this subject, we cannot be surprised at, when we consider the amount of opposition which the advocates of anæsthetics in human surgery, in their early days, had to contend against.

A CONTRIBUTION TO THE STUDY OF DISEASES OF THE NERVOUS SYSTEM.

BY PROFESSOR H. J. P. THOMASSEN, VETERINARY SCHOOL, UTRECHT, HOLLAND.

(Continued from page 92.)

ALTERNATE PARALYSIS.

1. The first case, extracted from the German Military Report, is one of alternate paralysis (facial and limbs), accompanied by hemianæsthesia of the face (trigeminal), which led to the production of a neuro-paralytic ophthalmia. The autopsy revealed a tumour which had invaded the medullary portion of the pons Varolii on the right side.

2. The case of alternate paralysis described by Boellmann, was not limited to the left facial (with ptosis) and the right lateral limbs, but also included complete paralysis of the trigeminus, the motor branches, and probably also the hypoglossal nerve, being affected. But this writer makes no mention of any lesion of the pons Varolii.

3. With regard to the first case that came under my own personal observation, this exhibited the characteristic symptoms of alternate hemiplegia, such as paralysis of the right facial nerve with ptosis, and the sensitive branches of the right trigeminus, as well as paralysis of the left lateral biped. The paralytic troubles gradually disappeared.

4. In the second case, in which the necroscopic lesions confirmed the diagnosis, there was paralysis of the facial and abducens nerves, with ptosis, and weakness of the limbs of the opposite side.

The paralysis of the facial nerve, the abducens, hypoglossal, etc., as well as of the limbs, are readily explained as symptoms of suppression, according to the extent of the lesion in the affected part of the pons Varolii (see Fig. 1). This was not the case, however, with the paralysis of the upper eyelid (ptosis), which was due to the inaction of the elevator muscle, this being supplied by a branch of the oculo-motor nerve.

In man, some cases have also been described, among others by Martin, Duchek, Wernick and Petrina, in which, consequent upon the presence of a tumour on the pons Varolii, there was noted, along with paralysis of the facial and abducens nerves, paralysis of this branch of the motores oculorum. Other authorities have pretended they observed this in hemiplegia due to disturbance in the *cortical centres.*

In the horse this symptom is more constant. We have nearly always noticed ptosis in this animal, along with facial paralysis, even in simple monoplegias, as soon as all the branches of this nerve are involved.*

Hemiplegias.

The seat of pathological derangements producing a cerebral hemiplegia—that is, paralysis of certain cerebral nerves and the limbs of the corresponding side—may be very different. This hemiplegia has primarily, for cause, a lesion of the peduncular portion of the pons Varolii, the cerebral peduncles, the opto-striated nuclei, the internal capsule, the

*Professor Hoffmann, in recently refuting the opinion of Professor Mœller (Repertorium für Tierheilkunde, 1893, p. 299), asserts he never saw this complication in facial paralysis.

fronto-parietal fasciculi of the centrum ovale, and, lastly, lesions of a certain extent involving several cortical centres of the fronto-parietal region of one of the hemispheres.

By a careful examination and paying great attention to the minutest details, the practitioner may sometimes succeed in fixing upon the seat of these troubles during the life of the patient. It is scarcely necessary to say that this regional diagnosis offers less difficulty in man than with animals, in which the most important symptoms—aphasia for instance—are absent; and nevertheless the most experienced physicians are often liable to incur mistakes through making a too venturesome diagnosis.

We think we may be able to class the cases of hemiplegia we have enumerated, as follows:—

We may admit as the seat of the lesion in the case related by Putzeys, the *peduncular portion of the pons Varolii*; here there was left hemiplegia, and all the branches of the facial nerve, with ptosis, were implicated.

The case of hemiplegia mentioned by Trasbot, likewise had its origin in this part of the protuberance. Girard found at the autopsy a lesion of this protuberance and of the cerebellum, chiefly on the left side and in the corpus striatum, of a horse that had been affected with paralysis of the left facial and hypoglossal nerves and the limbs on the same side of the body. If this lesion of the pons Varolii had caused derangement in the function of the two nerves just mentioned, the medullary portion must be considered as the seat, seeing that the intercrossing should be effected in front of the damaged part in order to have paralysis on the same side as the lesion, and in this case the paralysis of the limbs could only be attributed to the lesion in the cerebellum.

We may consider, as belonging to the *cortical cerebral hemiplegias*, the case related by Olivier, who discovered a cerebral arachnoiditis at the autopsy.

With respect to the case reported by Wilmotte, there is reason to believe that there was a lesion in the right hemisphere, causing an incomplete paralysis of the facial nerve and of the left limbs. The loss of appetite, prostration, and hard and frequent pulse, probably resulted from a leptomeningitis, which caused disturbance in the cortical substance, and this in its turn gave rise to the symptoms in question.

We would be inclined to include the case of paralysis mentioned by Noges among the cortical monoplegias, especially when there was only, besides the facial paralysis, merely monoplegia of an *anterior limb*, the psycho-motor

centre of which is situated in proximity to that of the facial; but a lesion in this part of the cortical substance will not account for the anæsthesia of the paralysed limb, always supposing that the insensibility has been really present, and that there was no error in diagnosis, in the sense that the animal was not in a condition to execute movements with the paralysed limb, even when this was irritated.

The microscopical lesions met with by Storch, and especially the hæmorrhagic focus in the left cerebral peduncle, explain the symptoms observed during life had the paralysis of the motores oculorum (ptosis) not been present on the same side as that of the limbs, instead of being on the side on which the lesion was seen.

In the human species, the ordinary seat of the hæmorrhagic foci producing a cerebral hemiplegia and hemianæsthesia, is the *internal capsule*. If the posterior or sensitive portion is affected, then there may be noted, in addition to the anæsthesia, a hemianopsis of the eye on the opposite side, and even disturbance in hearing.

Although there was no paralysis of the facial nerve in the horse treated by Professor Spinola, yet there is reason to believe that the seat of the lesion was the left internal capsule. The hemiplegia, the hemianæsthesia, the deafness and the blindness on the right side, would explain this. And we might admit a lesion limited to the anterior part (motor) of the internal capsule, in the horse treated by Delwart. It may be remarked, nevertheless, that in man the superior facial nerve is generally not involved in such cases, a circumstance probably due, as has been already said, to its fibres in all likelihood passing by another way than the internal capsule.

Affections implicating the *base of the brain* may be confounded with intra-cerebral lesions, and especially when they occupy the posterior region and extend to the pons Varolii and the medulla oblongata; in such a case there may be remarked—along with paralysis of certain nerves, as the facial, hypoglossal, oculo-motor, trigeminus, etc.—hemiplegia and hemianæsthesia of the limbs. Then the disturbance in the function of the nerves assumes the character of *peripheral paralysis*, the paralysed nerves exhibiting the reaction of degeneration.

The paralyses observed by Chauveau in a dog ought to be classed in this category, as well as the hemianæsthesia and the hemiplegia of the face of which Röll makes mention.

The second case, extracted from the German Military Report for 1888, was that of a horse which suddenly became paralysed in the left limbs. The autopsy only revealed a focus of softening in the *right* hemisphere of the *cerebellum.* This observation merits our attention on more than one account. It proves, firstly, the fact sometimes disputed, that the foci located in one of the cerebellar hemispheres may induce a hemiplegia, at least at the commencement, and all the more likely when they are acute in character; but they ought to be on the same side as the lesion, and in the present case the paralysis was on the side opposite the focus. In analogous cases sometimes observed in man, the cause assigned is the influence of the cerebellar focus on the pons Varolii or the medulla oblongata, whence results the paralysis, which is secondary in this case.

The interesting researches of Professor Luciani, of Florence, on the functions of the cerebellum* have demonstrated that total or partial extirpation of a cerebellar hemisphere engenders, besides symptoms of excitement (rolling, strabismus, etc.), starting from the intact parts, as symptoms of suppression, asthenia, and atony and ataxy of the muscles on the side on which the operation has taken place. The ataxy is most pronounced in the anterior limb. With respect to the two other anomalies, they are more especially exhibited in the muscles of the spine and in those of the posterior limb.

The disturbance in motility observed by Leisering and Mathis in the dog, may for the most part be allotted to the group of localised lesions which we are now about to notice, and for this reason we defer making an analysis of them at present.

Rotation on the Longitudinal Axis, or Rolling.—In veterinary literature some cases are related of this disorder in locomotion, having reference exclusively to the dog and rabbit. Although the rolling should be considered the principal symptom, yet it is nearly always accompanied by other symptoms which are not less characteristic, and may be briefly described as follows:—Generally the patient remains in the decubital position, and when it desires to move it does so in a rotatory manner. This rotation of the body on its longitudinal axis is usually executed with great rapidity several times, and always in the same direction. In other instances, the animal may, with difficulty, maintain itself on its legs, but it

* Das Kleinhirn. Neue Studien zur Normalen und Pathol. Physiologie. Von Luigi Luciani, Leipzig, 1893.

has a tendency to turn in a circle, and to fall from time to time, always on the same side. There is often deviation of the head, as well as conjugate deviation of the eyes, the ocular globe of one side becoming deviated towards the inner angle and downwards, and the other turned towards the external angle, and as much upward as the other is directed downwards.

In those cases in which an autopsy has been made, it is to be noted that there was nearly always found a lesion of the *median cerebellar peduncles*; and in more complicated cases, in which other symptoms were added to those we have enumerated, the lesions had also invaded the nerve centres situated more or less in proximity to the first.

Before undertaking to analyse the symptoms, and to consider them in relation to the lesions observed in some cases, it is necessary to allude to the clinical facts which we have been able to collect.

1. In the first case occurring in the dog, there was nervous disturbance of a complex character, as the list of symptoms given above will show. This was due to the extent of the lesions, which had extended to different and important nerve centres, and were also bilateral.*

A dog, six months old, had for some time shown a certain amount of feebleness in its limbs, and to such a degree that at intervals it fell on its right side. The head deviated to the left. In a short time it could not stand, and it then rolled from left to right; at times the whole of the anterior part of the body was rotated on the pelvis, the feet producing the displacement. These movements were executed when the animal was excited to movement by caresses. On the right side the two lips were flaccid and pendulous, the lower one falling into its ordinary position, and the upper one being in a reversed condition when the dog was placed on its back. The left eye looked downwards and inwards, and it was also affected with nystagmus. The right eye was directed upwards and outwards, and there was no spasmodic winking of it. Hearing was not impaired, as the dog wagged its tail in a lively manner when called by name. Analgesia was believed to be present, especially on the right side. The animal had not lost its appetite, but it could not take food, so that force was necessary to introduce sustenance into its mouth. Deglutition was very difficult, perhaps because of the torsion of the head and neck towards the right side. A

* We owe the unpublished information which follows, to the courtesy of Professor Nocard, by whom the patient in question was observed.

crystal of acetic acid introduced into the nostrils induced a strong reaction, and its application to the tongue and conjunctiva produced the same effect.

The rollings became daily more frequent, and the right hemiplegia was so evident that the dog could no longer rise. It was noted that the left ear was pendant, but the right one was erect. During the course of the disease the animal had choreiac movements. There were no rollings for some days, but they re-appeared towards the last, and were manifested by four to seven very rapid and successive turns. The nystagmus of the left eye persisted, and the winking of the right eye, though feeble, was nevertheless visible. The appetite completely disappeared.

The temperature was always normal; the pulse was very weak and frequent, numbering from 140 to 200 per minute; the respirations averaged 25 per minute.

Death occurred on the twentieth day.

Autopsy.—Systematic sections of the cerebellum and cerebrum demonstrated two distinct foci of red softening. The adjoining figures give an exact representation of the form and extent of the lesions (natural size). The left focus extends farther backwards, but not so far forwards as the other. We see the last vestiges of the first (Fig. 5) represented in a transverse section of the brain at the optic chiasma. The other is prolonged in front of the optic chiasma (Fig. 7.)

We owe some very interesting observations to Professor Mauri, of the Toulouse Veterinary School.

2. These first had reference to a four-years-old dog, which for five days could not stand, and lay on the ground. At rest it always lay on the left side unless some obstacle compelled it to choose another position. If excited, it displaced itself by making a series of turns on its longitudinal axis, and travelled as far as forty feet without stopping, always turning from left to right, relatively to its starting point. For instance, in decubitus on the left side it raised the lower end of its head towards the right, so as to twist the head on the neck, the latter on the back, and so on; in this movement the limbs became upwards and the back on the ground, and owing to the impulsion given the body fell on the right side; so that the first roll over was effected on the vertebral column as axis.

In the second time the axis of rotation was the sternum. The animal began by flexing its limbs, raising the head and insensibly applying its left side to the ground, and soon all

Fig. 1.

Fig. 2.

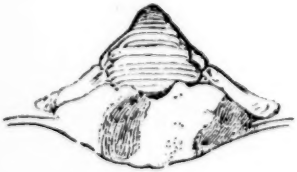

Fig. 3.

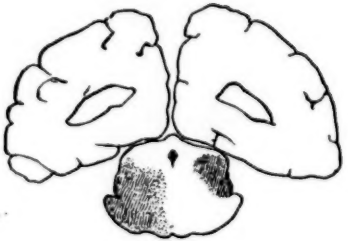

Fig. 4.

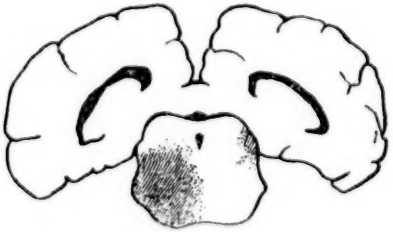

Fig. 5.

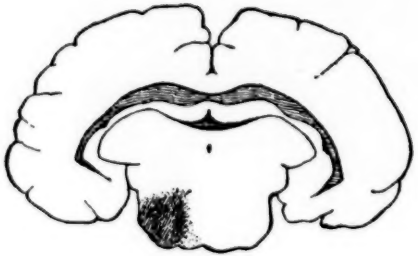

Fig. 6.

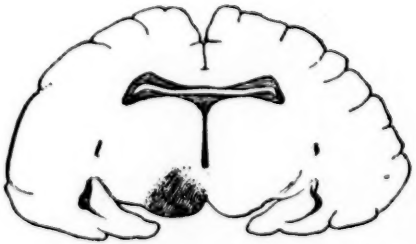

Fig. 7.

the body, after passing over the flexed feet, again fell on the left side, because of the effect of the torsion commanded by the head. The animal always stopped on the left side of the body.

If in raising the dog an attempt was made to place it on its feet, these became strongly agitated in a disorderly manner, but they did not in any case support the animal's weight. The head could not be held up, but hung between the fore legs, slightly twisted from left to right on the neck.

There was deviation in the eyes. The optic axis of the left eye was deviated downwards and a little inwards, while that of the opposite eye was directed upwards and slightly outwards.

The animal was incapable of seizing its food. General sensibility was intact. When called by its master, it moved its tail, and quite understood menaces, endeavouring to escape from punishment by the only mode of locomotion possible for it to adopt. At the end of a month it turned no more, and remained constantly lying on the left side.

Autopsy.—The pia mater was the seat of slight inflammation. The upper surface of the cerebellum was depressed on the left and behind, and the fissures and lobules were effaced in the posterior two-thirds of the left lateral lobe. In separating the medulla oblongata, a similar alteration to that in the inferior part of the cerebellum was observed. At these different points the tissue of the organ was reduced to a greyish-red pulp, in which the healthy parts in front seemed to be imbedded. This substance could be penetrated by the slightest pressure, and might be washed away by a small stream of water; it did not contain any vessels. The centre of the softening was in the left lateral lobe, and its ramifications extended posteriorly into the corresponding middle peduncle, towards the inferior surface of the cerebellum, then becoming attenuated it terminated near the right posterior peduncle. The left posterior peduncle was entirely destroyed; it had disappeared in the softened mass. The middle peduncle on the same side was intact at its origin, but on reaching the substance of the cerebellum it became softened in its posterior ramifications. The right lateral lobe of the cerebellum did not exhibit any lesion; its furrows and lobes were quite distinctly marked, and its peduncles, though most carefully examined, showed nothing abnormal.

3. In another dog, a year old, which offered almost the same symptoms as the preceding, Mauri found the following alterations at the autopsy: On the left lobe of the

cerebellum, the pia mater was inflamed and thickened, and on raising this membrane the subjacent tissue, which was softened, came away with it. All trace of furrows and lobules had disappeared over a large portion of the left lobe, and the disunited nervous substance was impregnated with blood and had a bright rose colour. The cerebellum being placed in alcohol for some days, and the softened parts having become suspended in the fluid, the organ then presented the following appearance:—The left lobe was excavated in its inferior part, by a cavity having the diameter of a nut, and involving the whole of the posterior peduncle, as well as the central portion of the middle one,and the intermediate cerebellum substance. The *middle peduncle* showed a remarkable lesion; at its origin, at the point where the pons Varolii is inflected upwards and backwards, it was of a greyish-red colour, and diminished in volume as if it had undergone constriction by a ligature. The softened part extended throughout its thickness, and the nerve substance having been removed while it was steeping in the alcohol, the peduncle was reduced to a mere tube with soft and flaccid walls. *This lesion had evidently destroyed all vital action in the middle peduncle* (?) The posterior peduncle was entirely destroyed. The right cerebellar lobe was in a normal condition.

4. A rabbit which for a month has carried its head to the right, began to move in a circle; it continued to do this for a short time, then it stopped and made several turns from right to left on its longitudinal axis.

The right peduncle of the cerebellum was found to be the seat of very advanced softening, so as to be completely destroyed as far as its point of subsidence in the substance of the cerebellum.

5. A three-years old spaniel which had been ill for five weeks, was at the commencement affected with general weakness, which was soon succeeded with a rotation movement in a circle. After some days the animal could no longer stand, and lay continually on the right side; when excited to move it rolled from right to left, displacing itself from left to right. The animal showed very marked strabismus, converging the right eye, and diverging the left one.

The dog died after three weeks.

The right side of the cerebellum and middle cerebellar peduncle were the seat of softening; they were reduced to a diffluent pulp of a greyish-red tint, penetrable on the least pressure and capable of being washed away by a trickle of

water. On the right side the fissures and lobules on the surface of the cerebellum had entirely disappeared.*

6. Professor Friedberger† mentions the case of a dog fifteen months old, the head of which was deviated from right to left, and which fell several times a day on the left side, especially when it was compelled to leave its cage. When it tumbled down it rolled, making several rapid rotations on its longitudinal axis, and then got up. It fell in such a way that the hind quarters came first to the ground, the head last. The animal was lively, and did not show any psychical disturbance. The temperature was normal and the appetite good. After twelve days the troubles subsided, and the animal left the infirmary *quasi* cured.

The following clinical facts were derived from personal observation :—

7. In July, 1889, a rabbit, seven months old, was brought to me presenting the following symptoms :—The animal constantly carries its head to the right, with the right eye looking upwards. From time to time it turned in a circle in such a way that the right side of the body was towards the centre of the circle. Then it rolled, especially if laid on its side, and each time made four or five turns on its longitudinal axis with great rapidity, the rotatory movement being from left to right. There was conjugate deviation of both eyes, the left eye being inclined inwards and downwards and the right eye outwards and upwards. The appetite was normal, and no other morbid symptoms were noted. The animal's growth had not been retarded, and it was as large as its congeners.

At the autopsy no microscopic lesion of the cerebellum or its peduncles could be detected. The brain and spinal cord were placed in Müller's fluid, but to our great regret they were lost, so that it was impossible to make a microscopical study of them, which would, no doubt, have been of much interest.

(To be continued.)

* For fuller details see the results of the histological examination made by Professor Montane, and published in the *Revue Vétérinaire* for January, 1893, p. 9.

† Jahresbericht d. Thierarzneischule in Munchen, 1877-78.

UNSUSPECTED POISONING BY STERILIZED MEAT AND MILK OF TUBERCULOUS ANIMALS.*

BY JAMES LAW, F.R.C.V.S., CORNELL UNIVERSITY, ITHACA, N.Y.

WITH an unaccountable shortness of vision, medical and veterinary sanitarians alike have never, up to the present hour, looked beyond infection by the tubercle bacillus in estimating the dangers to man of tuberculosis in our flocks and herds. We find, accordingly, that the question kept continually before the public is that of the presence or absence of the tubercle bacillus in any food product—meat, milk, butter or cheese—furnished by the diseased or suspected animal. The question of the presence or absence of ptomaines or other toxic elements which are calculated to prove hurtful, or even fatal, to certain members of the human race is not for a moment considered.

Hence we are met by the most elaborate arguments that tubercle is rare in the muscular system of cattle, and that muscle juice is inimical to the bacillus, and that therefore the muscular tissue, which forms the great mass of the dressed carcass, may, as a rule, be safely eaten, even though the internal organs have been affected by tubercle.

In Germany and other European countries the flesh of animals in which the tubercles are found in only one organ, or two related ones, is passed as wholesome. It is only when the tubercles are found in the bones, or muscles, or in the lymphatic glands among these, or, finally, when the tubercles are so generally distributed in different parts of the body that it is evident that the bacilli must have been carried by the blood, that the meat is rejected as unfit for human food.

So with milk and other dairy products. Many claim with Nocard that the milk is quite harmless so long as the udder is quite free from tubercle, and that it is only when tubercle is unmistakably present in that gland that this secretion is to be dreaded.

Even apart from these discussions as to the wholesomeness of flesh and milk, it is safe to say that up to the present every writer on the subject holds that even tuberculous meat and milk is rendered absolutely harmless by cooking. The consensus of professional opinion on this subject is tersely given by Salmon and Smith in their article on "Tuberculosis," in the work on "Diseases of Cattle," published by the Bureau of Animal

* Paper presented at the Fourth Annual Meeting of the New York State Veterinary Medical Society.

Industry—"Fortunately, tubercle bacilli are readily destroyed by the temperature of boiling water, and hence both meat and milk are made entirely safe, the former by the various processes of cooking, and the latter by boiling for a few minutes."

But this is altogether too narrow a view to take of the subject, and it is liable to lead to most serious and fatal results if put into every-day practice. The professional mind in concentrating its attention on *tubercular infection*, has practically entirely overlooked the no less real, and in many cases no less dangerous, fact of *tuberculous poisoning*.

To elucidate this matter, let us consider that much of the toxic matter produced by the growth of the tubercle bacillus is retained in Koch's "tuberculin," which has been absolutely sterilized. What then is the action of "tuberculin" on the animal system? A constitutional disorder with elevation of the body temperature commonly known as fever, and impairment of most of the bodily functions, notably those of assimilation and secretion. This is abundantly manifested in the wasting and fever of the victim of acute tuberculosis, in whom these poisonous principles are being constantly produced in large quantities. As the dose is reduced, a point is finally reached at which no fever nor appreciable systemic disturbance is produced, and thus in many slight and indolent cases of tuberculosis the animal appears well, and thus also the usual test dose of "tuberculin" has no recognizable disturbing effect on the healthy animal system. With a dose less than this it may even be questioned whether it may not be actually beneficial in conferring upon the healthy system a small measure of tolerance and power of resistance to the bacillus and its poisons. This, however, is of little account, seeing that no real immunity from tuberculosis is ever acquired. In many systems, both human and brute, the disease continues its slow progress for years, and the slight tolerance that results, though it may suppress the disease so that it assumes an indolent and chronic form, does not fully arrest it.

Very different is the effect of even a minimum dose of "tuberculin" on a subject which is already attacked with tuberculosis. In such a case the products of the existing tubercle are often so small in amount, and the system has acquired such a tolerance of them, that there is no manifest disturbance of health, and the animal may even be in excellent condition. But add to this minimum amount of poison, already in the system, a small quantity of "tuberculin," and in ten or fifteen hours the temperature of the

patient's body will rise two or more degrees above the normal, and the destructive process going on in the seats of the tubercles will be accelerated. In cattle this is now used as a most valuable test of the presence or absence of occult tubercle. In horses and other animals, the subjects of tuberculosis, "tuberculin" causes the same rise of temperature, and it may be accepted as a rule applicable to all classes of animals.

In the tuberculous man this action of "tuberculin" is a well-established fact, and was made the basis of Koch's employment of this material as a curative agent. The daily use of "tuberculin" in cases of lupus and other superficial forms of tuberculosis, led to a more active congestion and a molecular death of the tissues of the local tubercle, until these were separated from the living, healthy parts, and the progress of tuberculosis in that focus was arrested. If there were no deeper, unseen tubercles left in the system, a real cure might be effected in this way. But the cure in such a case was only secured by a temporary aggravation of the disease in its primary focus. If other tubercles existed in internal organs, they, too, had the morbid process aggravated and extended, and the death of tissue increased, by the introduction of "tuberculin" from without. In such a case the increased mass of tubercle, dead and living, remained confined in the midst of the surrounding tissues, and as the infecting materials could not be separated and cast off from the body, they continued their ravages with an increasing force proportionate to their recent artificial extension.

It is this extension of the tuberculosis, under the influence of the toxic products of the bacillus, which raises the most important question in connection with the consumption by man of the flesh and dairy products of tuberculous animals, and yet this question has been overlooked by sanitarians in the most unaccountable way. It has seemed enough for them that the living tubercle bacillus did not exist in the juices of the muscles nor in the milk. It seems never to have occurred to them that all the soluble toxic products of this bacillus were constantly circulating in the blood passing through the muscles, and that they equally traversed the blood-vessels of the mammary glands, and escaped into the milk. No pathologist can for a moment doubt this general diffusion of these toxic products.

Accepting this as undeniable, the presence of these toxins in the blood, flesh and milk, it follows that those who eat this meat and milk are taking in continually small doses of

"tuberculin," and in case they are already the subjects of tuberculosis, in however slight a degree or however indolent a form, this continuous accession of the poison will rouse this morbid process into a greater activity and a more dangerous extension.

If now we consider the prevalence of tuberculosis in the human population, and realise that every eighth death is that of a tuberculous person, we see what a fearful risk is being run by the utilization of the meat and milk of tuberculous animals, even if it could be shown that such meat and milk are themselves free from the living bacillus. Such reckless consumption of the products of tuberculous animals can only be looked on as a direct means of sealing the fate of that large proportion of the community which is already slightly attacked with tuberculosis.

The claim that the canning of tuberculous carcases and the boiling or Pasteurizing of milk does away with every element of danger, can no longer be entertained. Sterilization is not a restoration to a non-toxic condition; it does away with the possibility of infection, it is true, but it does not render the product innocuous.

As a matter of fact "tuberculin" has been sterilized by heat, but such sterilization has not rendered it safe and harmless. On the contrary, it invariably intensifies any existing tuberculous process, and develops fever and constitutional disturbance. When "tuberculin," therefore, is present in the meat and milk, it can only cause these to operate in the same way on subjects that have been already infected. In my experience with tuberculous cows, cases have come to my knowledge in which invalids, drinking the milk of such animals, have suffered very obviously, and have improved after such milk was withheld. So, too, in the case of calves sucking phthisical cows; they have done badly and proved unthrifty, though they took the whole of the milk furnished by their respective nurses, and they throve better when weaned and put upon solid food alone. I have followed some such calves until they grew up and were slaughtered, and have made *post-mortem* examinations and found them bearing old calcified tubercles, pointing back to the time when they sucked the infected and poisonous milk.

It is idle to say that such milk was merely lacking in nutritive principles; the calves in question had access to other food while following their nurses, and would not have been harmed by taking the same amount of pure water as they did of milk. Apart from the bacilli, which operated

slowly, and which allowed these animals to live for years, and even to thrive after they had ceased taking the milk, there was unquestionably in the milk a definite poison, which undermined the health and stimulated the progress of the tuberculous process.

It may be safely held, as proved by analogy, observation, and experiment, that the soluble poisons of tuberculosis invariably operate by exaggerating any existing tuberculous process, and that blood and all animal fluids becoming charged with such poisons, always tend to further endanger the health, or even the life, of any person who may consume them while suffering from tuberculosis.

We may freely allow that the transmission of the bacillus from man to man is far more common than from beast to man. But though the implanted seed may have been in many cases derived from a fellow-man, its subsequent destructive progress may be due far more to the constant accessions of the soluble toxic products conveyed in the meat and milk of tuberculous animals. Without these constant doses of the soluble poisons of tubercle the implanted germ would in many cases have proved comparatively harmless. Although it could be proved in regard to many cases that the cow had not contributed the seed of the disease, she is left little less responsible for the destructive progress and fatal result. The germ, which might have remained comparatively dormant and harmless in the absence of the poisoned meat and milk, is by these stimulated to a more deadly energy.

This hitherto unchallenged factor in the progress of tuberculosis opens up new and uncultivated fields for sanitary work. The great evil ventilated in this paper cannot be effectually met without the eradication of tuberculosis from every herd kept for supply of meat products for the public. Nothing short of this can be trusted to operate satisfactorily in putting a check upon the present fearful mortality from this disease. No inspection of dressed carcases, nor of milk, butter, and cheese will furnish a guarantee. We must go to the herds and subject them, animal by animal, to a critical test, and only accept the products as safe when there is no longer a shadow of suspicion remaining.

A professional examination of the most searching kind must be supplemented by the tuberculin test, before a clean bill of health can be furnished. In my own experience on cattle two-thirds of the cases of tuberculosis sometimes escaped under the most critical professional examination, and were

detected later by the tuberculin test. Often when cattle were condemned by the "tuberculin" test, have the owners pronounced them the most thrifty and the least suspected in the herd, and it was only after death, when the animals were opened and the caseated tubercle exposed, that they were satisfied that no mistake had been made. Recently in a herd kept for the supply of high-priced milk of guaranteed soundness, the stock having been subjected to a weekly examination by a veterinarian, the "tuberculin" test was applied and 50 per cent. of the herd demonstrated to be tuberculous. Without the "tuberculin" test there is no guarantee possible for the products of the dairy, and the sanitary officers who will affect to deal with this disease in herds without the aid of "tuberculin" are at best but pruning the tips of the branches of the evil tree. Public money ought not to be thrown away on such fruitless and ineffective work. The purification of a herd must be followed in every case by a thorough disinfection of contaminated buildings and places, and by a careful seclusion from new sources of infection. It is evident, therefore, that the non-tuberculous herd must be secured against the addition of fresh animals from any herd that has not been similarly attested sound, and that the necessary addition from another source must be tested by "tuberculin" before it is added to the herd. Equally important is it to test all farm animals of whatever species that live on the place and cohabit with the herd, and to see to it that no human being suffering from tuberculosis is allowed to attend to the animals or prepare their food. It is difficult to see how anything short of a system can afford any guarantee of the absence of the soluble tubercle poisons from our milk, butter and cheese.

In the case of butcher meats a professional examination when slaughtered, covering all the viscera as well as the carcass, will be essential, and the current doctrine of sound meat with localized tuberculosis must be abandoned. Every municipality must have its own public abattoir, in which alone its meat supplies should be butchered, and where every carcase should be systematically examined as it is opened. Private slaughter houses controlled by individual owners, afford endless opportunities for the evasion of sanitary statutes and ought to be abandoned as relics of an age when modern sanitary science was unknown.

The question of dressed, canned and salted meats, is one that must be carefully considered. It is quite evident that such products must come to us with a sufficient guarantee it

allowed to compete with our home meats that have passed the municipal inspection. It is equally evident that no inspector, paid by the packer or canner, can furnish a certificate which will command public confidence. The inspector must be a Government official who is entirely independent of the packers, and whose position is in no way dependent on their good will. Then again the existing method of furnishing Government inspectors at our great packing centres only and thus giving a monopoly to the larger operators, cannot be long maintasned in a country of equal rights and privileges The most obvious cure for this evil is to make all packing establishments Government institutions, where the small packer shall have equal privileges with the large, and where all carcases shall be subjected to the same scrutiny and shall go out with the same guarantee.

Such a proposition as the above will doubtless be severely criticised, both from the medical and economic standpoint.

On the medical side it will be argued that if the toxins in the meat and milk were as injurious as represented, we would see the evil results on every side and that medical men would be universally cognizant of them. And yet do we not see clearly to-day much that was never suspected twenty, thirty, or fifty years ago? How recent is the acceptance by the profession of the doctrine of contagion in tuberculosis, in tetanus, in pneumonia, in influenza, in glanders, &c. Are we to suppose that our forefathers were surrounded with fewer evidences of contagion, at a time when no precautions were taken to prevent it, than we are with all the antiseptic and antizymodic provisions of the present day? The facts of contagion were doubtless more abundant in their than in these days, but their attention had never been drawn to them. So now let the attention of physicians and sanitarians be given to the morbid action of the soluble poisons of tubercle, and evidence of its evil will accumulate on all sides. It is the scrutiny and not the facts that are wanting.

The economist will object to drastic measures for the suppression of tuberculosis on the ground of expense. Who is to pay for the municipal abattoirs, the inspectorships, the disinfections and the indemnities for slaughtered animals and condemned carcasses? In return let us ask who now pays for the constant losses of live stock which the proposed system would put a stop to; for the frequent infection of sound herds by unfortunate purchases of animals that prove to be tuberculous; for the losses to the nation, the community and the family of the tuberculous one-eighth of all deaths;

for the loss of work, literary, scientific, manufacturing, commercial, domestic and manual, of the great host of consumptives waiting all over the land to fill the places of this fatal eighth in coming mortality statistics; for the losses represented by the bills of the physician, nurse and druggist for these invalids; and for the losses represented by the many migrations and exiles in search of health, and of the costly consumption hospitals and sanitaria? And who is to pay in the future for the endless harvest of similar fruits which the seeds, now sown through our supineness, must inevitably produce in the coming generations?

Is it not a truer economy to destroy this seed before it has germinated, or even before it has been sown, than to wait for the multitudinous evils that must attend on its growth and fructification?

Our State Board of Health which has charge of tuberculosis, not in man only, but in cattle and other animals as well, should take this matter up earnestly. A year ago this Board was very apprehensive of evil results from the use of "tuberculin" as a means of diagnosis and only reluctantly allowed me to use the agent in examinations I made for it on condition I would personally bear the full responsibility for all untoward results. This I could afford to do, being well assured from past experience how trustworthy this agent is and how impossible it is to speedily eradicate tuberculosis from a herd without its aid.

Now that our excellent Board has reached a similar confidence, let me urge it to go a step farther, to accept the logical deduction of their present position, the presence, namely, of the toxic products in both meat and milk of the tuberculous animal and the pathogenic action of these on the tuberculous human consumer. Let our Health Board urge on the Legislature the necessity of providing means for the purification of our dairy herds and municipal abattoirs where all meats and animals for slaughter will be scrutinised by professional Government inspectors.

Editorial.

THE JUBILEE OF THE ROYAL COLLEGE OF VETERINARY SURGEONS.

In the year 1844 the veterinary profession in this country was incorporated by Royal Charter, which was granted in March of that year, and in the following month a meeting of those who were instrumental in obtaining it was held for the purpose of forming a Council to conduct the affairs of the Royal College of Veterinary Surgeons. Charters were not so easily obtained then as now-a-days, and this was not granted until after long continued and incessant agitation, and more than one refusal from the Government, which evidently had little sympathy with veterinary surgeons, and still less heed for improvement in veterinary medicine. The position of the profession and practitioners was certainly far from favourable previous to the obtainment of the Charter of Incorporation; for though the Royal Veterinary College had been established for more than fifty years, and though many able men were practising veterinary medicine, yet they possessed very little influence on the public mind, and veterinary surgeons were only too liable to be placed on the same level, and accorded the same treatment, as farriers and empirics. The cause for this, undoubtedly, lay in the fact that Government had not publicly recognised the necessity for fostering and encouraging animal medicine and surgery, and left this important branch of the healing art to develop as it best might, while it had to contend with most serious disadvantages. The standard of education, general and professional, was also low, owing to the teaching school having to subsist on the fees of its students and the contributions of subscribers, who were induced to contribute to its funds by offers of benefits out of all proportion to the amount of money asked for. Remembering the difficulties that had to be overcome in securing a Charter of Incorporation from an indifferent Government, and the consequent labour and anxiety devolving on its promoters—of whom, alas! only one now survives—veterinary surgeons must ever entertain a sentiment of gratitude and admiration for those of its members who first gave the profession in the United Kingdom an opportunity for working out its own destiny in its own way.

Though the Charter conferred important privileges, such as recognising veterinary medicine as a profession, giving its

practitioners exclusive right to the title of veterinary surgeon, enabling the Royal College to institute examinations of students, and to confer diplomas of competency to practise veterinary medicine and surgery; yet it did not embody all that its suppliants had wished for, and left much to be desired. For instance, though it gave exclusive right to a title, there was no power granted to protect this title, and consequently the profession was in no better position than before, with regard to empirics, who could adopt the designation, practise under it, and compete on equal terms with the diploma-holders of the Royal College; and it did not confer power to enable the Corporation to exert disciplinary control over its own members. The absence of these privileges certainly proved very detrimental to the welfare of the profession for many years after 1844, and were only finally secured by Act of Parliament in 1881, which completed and greatly enhanced the privileges and powers of the incorporating Charter, as well as put the profession on a legally recognised foundation. Great progress has been made by the Royal College since 1844, and the public has benefited by its work to a much greater degree, perhaps, than its members have. Indeed, there are those of a pessimistic turn of mind, who are inclined to think that the profession in the United Kingdom has seen its best days, and they point to certain events and circumstances which might go far to substantiate their fears and verify their prognostications. However this may be, the optimists might adduce other facts to counterbalance these gloomy apprehensions; and without siding with one or the other, we may safely assert that so long as the profession is as worthily represented as it was by those who obtained for it the Charter of Incorporation, it will occupy an estimable position among other scientific bodies which have to manage their own affairs and advance with the times.

TREATMENT OF TETANUS BY THE SERUM OF IMMUNISED ANIMALS.

Remesoff and Fedoroff (*Centralbl. f. Bakt.*, January 23rd, 1894), report a case of traumatic tetanus which, in their opinion, was cured by the administration of the serum of an immunised animal. The patient had well-marked symptoms of the disease when he was injected subcutaneously with 50 c.cm. of the serum of a dog which had been rendered immune to tetanus. The curative value of the serum was estimated at 1 : 300,000. On the following day there was already considerable improvement. During the next three days three further injections of this serum in the same amount were given. The patient's condition steadily improved, and he was discharged well on the fourteenth day from the commencement of treatment. The authors arrange in the four following groups all the recorded cases of treatment of tetanus by

immunised serum: (*a*) Cases in which the symptoms commenced to abate immediately after injection, and then steadily disappeared; (*b*) those which remained *in statu quo* for a short time after injection, and then gradually improved; (*c*) those in which no further muscles became involved in spasm after commencement of treatment, though occasionally an aggravation of certain other symptoms (as trismus, difficulty in swallowing) occurred; (*d*) those ending fatally, notwithstanding treatment. A survey of cases so treated brings out the following notable facts:—The duration of the disorder is decidedly diminished by the treatment; the temperature is reduced; sleep is restored; the attacks of spasm grow weaker and rarer; the pulse frequency is diminished; lastly, there is great improvement in the general condition.—*British Medical Journal.*

THE PROPOSED VETERINARY COLLEGE IN IRELAND.

As will be noticed in our Parliamentary Intelligence, Mr. Morley, Chief Secretary for Ireland, when replying to a question as to the Government granting a sum of money to aid in establishing a veterinary school in Dublin, stated that in the Veterinary Surgeons Act it was contemplated that such a school would be established. We are in a position to assert that when the Act was passed there was no prospect whatever of such an occurrence, much less of Government having anything to do with a veterinary school in that country. Clause 4 of the Act merely mentions that "the Royal College of Veterinary Surgeons shall be bound to make provision in the manner permitted by their Charters, for the examination in England of the students attending the Royal Veterinary College, and in Scotland of the students attending the several Scotch veterinary colleges, and in Ireland whenever a veterinary college shall be established in that country." This enactment was merely to ensure the examination and registration of students when a college happened to be instituted in Ireland, but such was certainly not contemplated at that time. It may be mentioned that similar provision was made in the Charter of 1844, in which the students of "the Royal Veterinary College of London, or of the veterinary college of Edinburgh, or of such other veterinary college, corporate or unincorporate, as now is or hereafter shall be established for the purposes of education in veterinary surgery, whether in London or elsewhere in our United Kingdom," were guaranteed examination by, and certificates of qualification from, the Royal College.

So that it is mere sophistry to assert that the establishment of a veterinary college in Ireland was contemplated in 1881.

THE INTERNATIONAL MEDICAL CONGRESS AT ROME.

THE recent Medical Congress does not appear to have yielded very much that is professionally interesting to veterinary surgeons. In the section of pathology three subjects were dealt with that command attention. On March 31st, Professor Bonome had a paper on

Glanders.

It dealt with investigations on the biological action of the products of the bacillus of glanders. These products varied in their action according to the animals used and the mode of cultivating the bacillus. Rabbits infected with the bacillus of glanders, even when the latter was attenuated, were extremely sensitive to mallein, even when the animals were to all appearances in good health. These poisons gave rise to nodules scattered throughout the organs, and the same results might be obtained in guinea-pigs. Twenty-four horses out of 32 suspected of glanders reacted to mallein, and 17 were found to be infected, whilst 6 were not, so that the reaction was not an absolute proof of

the presence of glanders. Very small doses of mallein injected in a man suffering from glanders produced typical symptoms of reaction, lasting from six to thirty hours, as well as great amelioration of the symptoms, and even cicatrisation of the nodules. In horses he got very good results with a mallein obtained from the blood and organs of cats. He was able to cure one horse which was suffering from typical glanders. The same result was obtained in dogs, whilst the control animals not inoculated with mallein all died from glanders.

Professor VIRCHOW spoke of the excellent results obtained in Germany by using a dried preparation of mallein for the diagnosis of glanders.

Pyrogenic Substances.

Dr. JULIUS DONATH and DR. GEYZA GARA read a paper on fever-producing substances. The fever depends on the kind of microbes which are used, whilst some do not produce any fever at all. With anthrax products the fever appeared in rabbits on the second day, and lasted four to five days. The same result was produced on sheep, whilst he obtained similar results in horses with the products secreted by the streptococcus. He confirmed the fever-producing action of the chemical products of the bacillus pyocyaneus discovered by Charrin and Ruffer. Extracts of the spleen of animals which had died from infectious disease—for, example, swine fever—proved extremely toxic, and their injection was followed by fever.

Cancer.

In a discussion on cancer, more especially with regard to its parasitic nature and inoculability, Professor PIO FOA stated that cancer grafting had been successful, for although it was impossible to graft the cancer of man on animals, yet the experiments of Hanan and others proved that cancer of animals could be successfully inoculated in another animal of the same species.

Professor TRASBOT (Alfort), said that he would speak from the veterinary point of view. Cancer was fairly common in dogs and horses, but less frequent in cattle; the tumours previously described as carcinoma and sarcoma of cattle, having lately been proved to be cases of actinomycosis. In dogs cancer was common enough, but in a great many cases tubercle of dogs had been mistaken for cancer, and hence the so-called successful inoculations of cancer in dogs must be regarded with the greatest scepticism, unless controlled by an accurate histological examination. Personally he had made numerous inoculations of canine carcinoma into other dogs, and had only once obtained a positive result. But in that case even the tumour grew for a few months only, and was then reabsorbed without any metastases forming in internal organs. He was of opinion, therefore, that cancer could not be inoculated from one animal to the other.

Dr. CAZIN (Paris), spoke of the inoculation experiments which he had performed on dogs suffering from cancer. Inoculations into animals of the same species had hitherto proved unsuccessful, except in three cases of non-malignant tumours of the penis. In these three cases he had been able to reproduce the same tumour by grafting it into other animals; but all cases in which he had grafted epithelial tumours had uniformly proved unsuccessful. Graftings from the tumour of a dog to another part of the same animal's body had always been attended with success. He had also performed experiments on rats, which were, however, not yet ready for publication.

NEW IMPROVED TRACHEOTOMY TUBE. (PATENTED.)

TRACHEOTOMY tubes hitherto constructed have been found difficult to insert, and insecure when introduced. This tracheotomy tube is a modification of Field's and Jones' but possessing several important advantages.

1st. A sliding arrangement, whereby the halves must necessarily be held securely together;

2nd. Only one shield is required, which considerably reduces the weight;

3rd. By rounding or flanging the lips of the tube, prevents the possibility of irritating the trachea;

4th. The fastening arrangement is very simple and secure, and would be impossible to become unfastened of itself;

5th. It is constructed of a metal which does not corrode or oxidise, and is the same throughout.

This tracheotomy tube is made and patented by Messrs. Arnold and Sons of West Smithfield, London, and we append a copy of the letter received from Veterinary-Lieutenant J. A. Meredith, who has thoroughly tested this form of tube in use.

HULME BARRACKS,
MANCHESTER.

DEAR SIRS,

I am much pleased with your new tracheotomy tube. Its simple construction allows it to be easily introduced, keeps well in position, light, and besides, does not cause

so much pain in a fresh operated wound. I think you have made quite a first-class instrument, and one I should certainly purchase for myself.

I would suggest your bringing it to the notice of the veterinary profession.

Yours truly,
J. A. MEREDITH.

RAPID CURE OF RINGWORM IN HORSES.

IN the *Recueil de Med. Veterinaire* for last January, MM. Fourie and Le Calve, Veterinary Surgeons in the French Artillery, describe their treatment of Tinea tonsurans. This skin affection is not uncommon among army horses, and especially remounts, and unless promptly attended to is rapidly spread from the diseased to the healthy animals, particularly through the medium of the grooming implements. The vegetable parasite that occasions it is not very difficult to destroy, but sometimes more than one application of the usual topical remedies is necessary before it is deprived of vitality. Fourie and Le Calve had recourse to the following mixture, which acted most effectively and quickly:—

Crystallised Carbolic Acid
Tincture of Iodine
Chloral Hydrate
} Equal parts of each.

The hair is clipped from the affected parts, which are then washed with soap and water. By means of a brush the mixture is lightly painted over the patches so as to give them a thin layer. In a short time these become inflamed and slightly swollen, after which the surface dries and is hardened; in a few days it cracks and a crust falls off, leaving the skin quite healthy.

AMERICAN CONSUMPTION OF DISEASED MEAT.

AMERICAN meat has, for some years, enjoyed so unsavoury a reputation abroad that it has become necessary for the Government to provide a regular corps of inspectors of meat that is to be shipped abroad, and to put its seal upon all foreign shipments of meats, in order to secure any sale for this class of American food products abroad. But this inspection is, for the most part, confined to meats that are shipped to foreign countries. American consumers of meat are not thus protected. A man who has for many years been employed in the Chicago stock-yards, stated to the writer less than a year ago that he had many times assisted in smuggling diseased cattle into side pens, whence they were conveyed to slaughter-houses and prepared for the market. He assured us it was not all difficult to evade the inspectors, and that the thing was a matter of every-day occurrence, thousands of these cattle being thus slaughtered and consumed annually.

Recently this fact has become so notorious that the Mayor of Chicago has found it necessary to take the matter in hand, and has issued peremptory orders that the licensing of all slaughtering establishments should be permanently revoked when it was found that diseased animals have been killed in them. The Chicago *Tribune*, which is always on the alert for matters of this sort, has been looking this matter up, and publishes in a recent issue the following report of an interview with the Health Commissioner, which conveys information which ought to be sufficiently startling to induce every consumer of beef to ask himself the question: Is it safe to indulge in the use of the flesh of animals as food?

"It is the duty of the State inspectors to inspect cattle on the hoof, of the city inspectors to inspect meat only. There are not enough State inspectors for the work, and I have had my five inspectors given the power of the State men. The Health Department inspectors condemned 1,350,337 pounds of meat last year as being unfit for human food. I do not presume we caught a

fractional part of the whole amount. In justice to the largest packers I want to say that no diseased meat is ever found in their establishments. But there are numerous proprietors of small establishments who resort to every possible device to get a diseased animal into the pens without the knowledge of the inspectors. It is those fellows we are after. The United States Government inspects every pound of meat that goes to foreign countries, and I think the people of Chicago should be given the same protection that foreigners have."—*Modern Medicine and Bacteriological Review.*

THE MICRO-ORGANISMS "BABESIA."

In a recent number of the Roumanian *Veterinary Review*, Starcovici has an article on a parasite discovered by Professor Babes, which possesses much interest. After the establisment of the Institute of Pathology and Microbiology at Bucharest, numerous investigations were made by Babes with the object of determining the etiology and nature of the epizootic or bacterian hæmoglobinuria of the ox and the "circeagul" of the sheep, diseases which cause much damage in Roumania. The results of these studies have been rendered more valuable by new researches with regard to the pathological anatomy, the experimental transmission to living animals, and the culture and biology of the micro-organism.

After showing, in a comparative manner, the experimental investigations in these two diseases and Texas fever, the author arrives at certain conclusions, of which the following is a summary:

There are differences between the three maladies: hæmoglobinuria, Texas fever, and "Circeagul," not only with regard to their characters, but also with respect to the parasites that engender them, though these latter may be included in the genus "Babesia."

The most important points that differentiate hæmoglobinuria from Texas fever are to be found as much in their clinical aspect as in that of the pathogenic agents. The incubation of hæmoglobinuria may be fixed at a period of fourteen days, while that of Texas fever has ten days. The first has only an acute form; the second has, in addition, a chronic form, which is benignant when it ensues some weeks after the acute stage. Texas fever causes a mortality of 90 per cent., whereas the other disease has only a mortality of 50 per cent. The former is accompanied by well-marked anæmia without the hæmoglobinuric state being constant, while the latter malady is really constituted by the hæmoglobinuria itself, the anæmia being but little marked.

The intestinal alterations in hæmoglobinuria are not always met with in Texas fever, and, besides, the hæmorrhagic œdema of the peritoneum, which is never absent in hæmoglobinuria, appears not to be present in Texas fever.

During the acute and serious period of Texas fever, the micro-organism is found with its usual characters, a circumstance that is noted only at the commencement of hæmoglobinuria, and then only in the circulating blood, The brief remission that occurs in the fever of hæmoglobinuria is not observed in Texas fever.

Hæmoglobinuria is enzootic in countries with an extreme temperature, while Texas fever is, on the contrary, enzootic in hot countries with a constantly elevated temperature.

The micro-organisms of circeagul of the sheep resembles those of hæmoglobinuria, but they are less numerous, of a round form, and not elongated, as in the latter disease.

For reasons given by the author, it is proposed to place the micro-organisms in question at the bottom of the list of protozoa, and considering them

as transitional between these and bacteria; their position will therefore be as follows:—

Protozoa.

"Babesia." { Pyrosoma bigeminum (Th. Smith).
Babesia bovis (Babes).
Babesia ovis (Babes).

Bacteria.

Reviews.

LIGHT HORSES: BREEDS AND MANAGEMENT. By W. C. A. BLEW, M.A., WILLIAM SCARTH DIXON, DR. GEORGE FLEMING, C.B., F.R.C.V.S., VERO SHAW, B.A., ETC. (London: Vinton & Company, Ltd., 1894.)

LAST month we had the pleasure of favourably noticing an excellent book on sheep, by Professor Wrightson, the first of a series of handbooks on live stock which are in process of publication under the direction of Mr. Sinclair, Editor of the *Live Stock Journal;* and now we have to direct attention to the second volume of the series, devoted to the history, breeds, and management of light horses. We may at once say that the book is in every way worthy of a place alongside its predecessor, whether we regard its subject matter, its illustrations, or its general get-up. Nothing more interesting, complete, and concise has ever appeared, we feel assured, on the different breeds of English horses, and this section alone should render the book acceptable to veterinary surgeons, to whom a knowledge of this subject is of more than ordinary importance. There was also chapters on the Arab horse and the American trotting horse, which are replete with interesting and useful information. The book consists of twelve chapters, and these deal with the thoroughbred horse, the hackney, Cleveland Bays and Yorkshire coach horses, the Arabian horse, the American trotting horse, the hunter, the hack, ponies, asses and mules, management of light horses, and diseases and injuries to which light horses are liable. In addition to a large number of woodcuts of horses and ponies, there are two beautiful steel engravings of St. Simon and a real Yorkshire horse. The publishers are to be congratulated on their spirited enterprise in offering to the public such a handsomely got-up manual for the small sum of three shillings and sixpence, and it is to be hoped they may be encouraged and compensated by a large and rapid sale.

THE WORLD'S SHEEP FARMING FOR FIFTY YEARS. By WILLIAM COOPER AND NEPHEWS, M.R.C.V.S. (Berkhamstead: W. Cooper & Nephews, 1893.)

This little book, produced by a member of the veterinary profession and his nephews, is published in commemoration of the jubilee of Cooper's Sheep-Dipping Powder, and gives a review of the sheep industry in nearly every country during the fifty years covered by the history of this very useful and world-famed ovine parasiticide. It contains a wonderful amount of information conveyed in a series of well-written sketches and illustrations of a somewhat novel character, in regard to this special industry. Everyone interested in the past, the present, and the future of sheep farming should possess himself of a copy of this booklet, which, within the compass of a hundred pages, supplies facts and figures that are not likely to be obtained elsewhere with regard to sheep and wool. The allusions to sheep-dipping in different parts of the world are also very instructive; and the reference to the rise and progress, as well as manufacture of the renowned sheep-dip powder is not less

entertaining and informing, showing what an enterprising scientist can accomplish from small beginnings.

Parliamentary Intelligence.

HOUSE OF COMMONS, March 15th.

VETERINARY SCIENCE AND GOVERNMENT GRANTS.

Mr. FIELD asked the Chancellor of the Exchequer whether, in addition to the sum of £15,000 proposed to be allocated for the establishment of a veterinary college in Dublin, he was prepared to moderately endow the institution as one pertaining to technical education in Ireland?

Mr. HOZIER asked whether the Government proposed to give, for the benefit of veterinary science in Scotland, a grant corresponding to the £15,000 proposed to be given to Ireland; and, if not, would the Chancellor of the Exchequer kindly tell the House why?

Mr. J. MORLEY, who replied, in answer to Mr. Field, said that he did not think it would be possible for him to add to the proposal which he should by-and-by make to the House to give £15,000 for a veterinary college in Ireland, any proposal for its endowments. In reply to Mr. Hozier, he might inform the hon. member that the money with which it was proposed, with the consent of Parliament, to staff this college in Ireland, was not imperial money, but money already voted to Ireland. It was a redistribution of certain Irish funds voted for Irish purposes.

April 3rd.

ANTHRAX.

In answer to Mr. FELLOWES,

Mr. GARDNER said the recommendation made by the Central Chamber of Agriculture last November, and by other agricultural bodies, that local authorities should be empowered, in the case of the death of an animal from anthrax, to award to the owner the market value of the carcass (not to exceed £1), could not be carried out without legislation, but in any case he did not think its adoption would be of any material assistance in preventing the spreading of disease. He could not conveniently state the objections to the proposal within the limits of an answer to a question, but, if the hon. member would communicate with him personally, he should be happy to explain them to him, and he might also refer him to the letter he addressed to the Central Chamber of Agriculture on the subject on the 22nd of November last. With regard to the suggestion of the hon. member for the appointment of a departmental committee, he should be happy to consider whether such an inquiry would be of advantage, but he wished, in the first instance, to be in possession of certain reports for which he had called respecting the feasibility of inoculation for anthrax, and as to the measures adopted in foreign countries to prevent the spreading of the disease.

April 13th.

VETERINARY COLLEGE FOR IRELAND.

In answer to Mr. W. JOHNSTON,

Mr. J. MORLEY said: The deputation which waited upon me in January last urging the necessity for a veterinary school in Ireland, was not confined to any locality or particular profession, but was representative of various classes and interests throughout Ireland. I would also point out that Parliament in 1881 contemplated the creation of a veterinary college in Ireland, as in the Veterinary Surgeons Act of that year, express provision is made for the examination of students in Ireland whenever a veterinary college should

be established there. It is proposed to ask Parliament to allocate the sum of £15,000 as a grant in aid towards acquiring college buildings and fittings. It is not proposed to take it from the current year's residue of the local taxation duties (Customs and Excise) grant, but from the invested accumulation of that grant.

April 19th.

SWINE FEVER REGULATIONS.

In answer to Mr. FELLOWES,

Mr. GARDNER said: Under the orders issued on the subject of swine fever, it is the duty of the local authority to apply the necessary restrictions immediately upon their receiving information as to the existence or supposed existence of the disease, without waiting for the result of any examination of the viscera made by the veterinary officers of the department, upon whose verdict the payment of compensation for swine compulsorily slaughtered must necessarily rest. It is doubtless the case that in some districts the local organization was at first defective, but a gradual improvement has been effected, and there is now no reason to suppose that any very serious spread of the disease occurs owing to delay in dealing with the outbreaks reported.

April 23rd.

IMPORTATION OF CANADIAN CATTLE.

Mr. GARDNER, replying to questions addressed to him by Dr. FARQUHARSON, Mr. CROMBIE, and others, said he had received many representations from agriculturists in the eastern counties of Scotland as to the advantages attending the importation of Canadian store cattle. Upon a most anxious review, however, of the whole sequence of events he was forced, with much regret, to the conclusion that he should not be justified in restoring the privilege of free admission to Canadian cattle, until he was in possession of the evidence which would be afforded by a further examination of the lungs of the animals slaughtered at the port of landing. The examination would not be of a protracted character, and if the results confirmed the representations made to him concerning the absence of pleuro-pneumonia in Canada, and if no adverse circumstances arose, he should then, he considered, be bound to dispense with slaughter at the port.

Army Veterinary Department.

VETERINARY-LIEUTENANT E. J. LAWSON (4th Hussars) has embarked for Egypt, to replace Veterinary-Captain E. E. Bennett, who exchanges for Home Service.

Veterinary-Major J. K. Grainger has been transferred from Aldershot to Dublin for duty with the 3rd Hussars.

Veterinary-Captain W. A. Crow and Veterinary-Lieutenant J. H. Jackson have arrived from India on six months' sick leave of absence.

Obituary.

THE following deaths of members of the profession have been reported:—

George Brown, M.R.C.V.S., Rochdale	graduated in 1844.
Richard Barker, M.R.C.V.S., Middlewich, Cheshire,	„ 1849.
Roger Bridge, M.R.C.V.S., Bury, Lancashire ..	„ 1850.
J. B. Taylor, M.R.C.V.S., Ashton-under-Lyne ..	„ 1862.
W. M. Pegg, M.R.C.V.S., London	„ 1873.

A valued correspondent sends us the following remarks on the late W. H. Farrow, M.R.C.V.S., whose death was briefly recorded in last month's JOURNAL.

"By the death of this gentleman at the early age of thirty-five, the profession has lost one of its most honourable and capable members. He succumbed to an attack of typhoid fever, after an illness of some eight days, despite all that medical skill could do.

"Mr. Farrow belonged to a family well-known in veterinary circles. He was the eldest son of Mr. William Hastings Farrow. M.R.C.V.S., a retired member of the profession, and grandson of the late William Farrow, of Whitechapel, both successful practitioners. His diploma bears date January 5th, 1880. Though taking no active part in what may be termed the politics of the profession, yet he always had its welfare at heart. He was a kind friend to many in need, and was frequently called upon to act as arbitrator in professional cases, his decisions generally giving satisfaction to both parties. A kinder husband, a better son, a more affectionate brother, or a more faithful friend it would be hard to find. Of him it could be truly said that he was:—

'The kindest man,
The best condition'd and unwearied spirit
In doing courtesies.'

"He was interred in Abney Park Cemetery on March 21st, and was followed to the grave by many of his friends and old servants.

"The only members of the family now practising the profession are his uncle, Mr. Arthur Hastings Farrow, of Whitechapel, and his cousin and brother-in-law Mr. Henry Gray, of Kensington."

The Veterinary Service of the French Army has sustained a somewhat serious loss by the death of one of its most promising of the younger officers, M. V. Lenoir, second-class veterinary surgeon, and chief of the Veterinary Service in the Soudan. He formed one of the small column under the command of Colonel Bonnier, which was surprised by the Tonarey Arabs near Timbuctoo, in the Soudan, not long ago, when nearly all the officers were killed, he being among the slain. He had served for more than ten years in Senegal and the Soudan, the unhealthy climate of which he seemed to resist in a surprising manner. He was devoted to his profession, for which he did much, and his reputation was greatly enhanced by his interesting observations on the Cayor Fly (*Ochromyia anthropophaga*, Blanchard), described in Neumann's "Parasites and Parasitic Diseases of the Domesticated Animals" (English edition, p. 43).

Jurisprudence.

CITY OF LONDON, GUILDHALL POLICE COURT,
20th April, 1894.

(Before Mr. ALDERMAN RITCHIE.)

JOHN KNIGHT was summoned at the instance of the Royal College of Veterinary Surgeons, for an infringement of the 16th section of the Veterinary Surgeons Act, 1881.

Mr. THATCHER, the college solicitor, prosecuted, and after reading the 16th section of the Act, stated that the prosecution arose out of a case which was head at that court, on the 13th of February last, in which Walter Bannell was charged with cruelty to a horse, by working it while in an unfit condition; and he stated that Mr. Savournin, M.R.C.V.S., gave evidence in support of the prosecution, and that the defendant, who professed to be a veterinary surgeon, gave evidence on behalf of the defence; he was asked by the Clerk whether he was a member of the Royal College of Veterinary Surgeons, and he said that he was.

Sir James Whitehead, who tried the case, convicted Bannell, and calling the defendant before him, told him that he did not believe one word of his evidence, and that it was a lamentable thing that men who carried on business as veterinary surgeons should come there and give such evidence as he had done.

The matter was brought to the attention of the college, and it was immediately discovered that the defendant was an impostor, and not a veterinary surgeon at all. The college considered that it was a very bad case indeed; the defendant had deliberately endeavoured to impose upon a court of justice, and to cast a slur upon an honorable profession, and he pressed the Magistrate to inflict the maximum penalty of £20.

Mr. SAVOURNIN, M.R.C.V.S., and Mr. LAWES, both deposed that they were in court upon the occasion referred to, and that the defendant in answer to a question from the Clerk of the court, distinctly said that he was a member of the Royal College of Veterinary Surgeons.

The defendant denied that the witnesses were speaking the truth, and said that all that he had said was that he was a veterinary surgeon.

Mr. THATCHER: He is not a veterinary surgeon at all in any sense of the word; he is not a Fellow or Member of the College, he is not a holder of the Diploma of the Highland and Agricultural Society of Scotland, and he is not a registered practitioner; he is no more a veterinary surgeon than I am.

The defendant said that he had been apprenticed to a veterinary surgeon in 1858, and had served four years there, and that he considered that he was a veterinary surgeon.

Mr. ALDERMAN RITCHIE: It is no use your talking like that, you are not a veterinary surgeon, and you are certainly not a member of the college, which two witnesses have sworn you said you were. I consider that you committed perjury and it is altogether one of the worst cases of the sort; the prosecution was instituted for the purpose of protecting poor dumb animals who cannot help themselves, and you came here and gave evidence as a member of the College of Veterinary Surgeons, in support of the cruelty which had been committed. I shall inflict upon you the maximum penalty of £20 and costs, and if you cannot pay, and have not sufficient goods to satisfy a distress, you shall go to prison for a month.

The defendant said he had not the means to pay, and he was committed to prison accordingly.

GLANDERS.

At the Dudley Borough Police Court recently, William Kendal, nailmaker, Dudley Wood, was summoned at the instance of the Corporation for having in his possession a diseased horse without notifying the same to the Inspector under the Diseases (Animals) Act as soon as practicable.

Mr. E. M. WARMINGTON (Town Clerk), who appeared to prosecute, said the case was a very important one, because glanders, which defendant's horse was suffering from, was liable to be taken by mankind. There had been glanders in the district where the horse had been kept, and the Legislature had imposed heavy penalties for non-compliance with the orders issued respecting the disease. He might say that knowledge was not an ingredient in the case, although that might seem rather hard.

Mr. BARRADALE (magistrate's clerk) read the evidence of a man named Harper, given when the case was first before the Court. He said he bought the horse from defendant for £4 15s., and that two days after he found that it had a cold, and took it to Mr. Green, the veterinary surgeon.

The TOWN CLERK said it was evident from Harper's evidence that the horse had something the matter with it while in the possession of defendant,

and the fact of selling the horse for so small a sum, ought to have given defendant some notice of the fact. He wished the public to know that the Local Authority had appointed an inspector under the Act, and his services were at the disposal of the public, without any charge. If defendant had taken the horse to Mr. Green it would have been examined, and he could have obtained any information free of cost.

Mr. BAGOTT said it was most important that the public should know that.

The TOWN CLERK said it was no defence to say that defendant did not know the horse had glanders. He hoped after publicity had been given to the case the public would comply with the Act.

Mr. GREEN said he examined the horse, found it suffering from glanders, and ordered it to be destroyed. From a *post-mortem* examination he had made he was of opinion that the disease had been in existence for three months. The division between the nostrils was completely eaten away, and there was a constant discharge.

P. C. HALL said he was stationed in the district where the horse was kept, and he received no notice of the disease.

Fined 20s. and costs.

Proceedings of Veterinary Medical Societies, etc.

CENTRAL VETERINARY MEDICAL SOCIETY.

(*Continued from page* 278.)

Mr. A. L. BUTTERS then read a paper on—

"INTESTINAL CALCULI IN THE HORSE."

Mr. President and Gentlemen, the subject which I have the honour to bring before you is not a modern one and does not possess the charm of novelty; but connected with it are some very interesting physiological and chemical problems. These, however, I have left for men of learned leisure to study—perhaps to solve; my paper is of an introductory rather than of an exhaustive character, and I have written it thus because I take it that cases of disease arising from calculi are not occurring frequently in our practices. They are in fact rather rare, and life is too short for any one man to acquire from personal experience a profound knowledge of the subject; it is therefore one where a free interchange of our views and experiences is especially valuable and if my paper provokes a good discussion its object will be attained.

I have divided the subject into four parts, viz, the varieties, causes, symptoms, and treatment.

Varieties.

The calculi found in the intestines of the horse, as you will perceive from the specimens before you, vary considerably in size, shape, weight, and chemical composition. A comparison or these two specimens will show the difference in size. In weight they vary from 1oz. to about 20lbs., but the majority generally range from about 1 to 7lbs. The surface of some are smooth and polished, while others are rough. They are all more or less spherical in shape, unless there are several in the bowel at one time when they present surfaces which are more or less flattened.

The late Professor Morton divided them into three classes, viz., the Phosphatic, the Oat-hair, and the Mixed, and all the specimens I have seen can be classified under one of these three heads.

The *Phosphatic* are the most frequently met with and are the heaviest kind

of calculi, they have a smooth or polished surface. Their chemical composition in 100 parts is given as

Ammonio-phosphate of magnesia	48·00
Phosphate of calcium	19·00
Water	14·00
Animal matter..	·80
Soluble salts, etc.	6·60
Extractive matter	4·00
Fatty matter	7·00
Loss	·60

As a rule there is but one phosphatic calculus found in the intestine at one time, but occasionally there are several, and in one case that came under my notice there was over 150 in the intestine. I have the specimens here. In this respect they differ from other forms of calculi, for I have never known more than one oat-hair or mixed calculus to be found in the intestine at one time.

Oat-hair calculi, or more commonly called dust balls, are said to be found in the cœcum or colon, and consist, as their name indicates, almost entirely of the beard of oats, barley, or other grain. They sometimes attain a large size, but compared with the phosphatic are light in weight; they generally assume the same shape, and are sometimes mixed with phosphatic salts.

Mixed calculi are less constant in their composition, and are occasionally called dung balls. They are composed of phosphatic salts, fæcal matters, oat-hair, or any indigestible matter found in the intestine.

After this brief survey of the different varieties of calculi I shall now go on to the causes which lead to their formation; this I consider is not only the most important and interesting part of my subject, but is also the most difficult. Interesting as it enables us to give our clients a reasonable explanation for their presence in the alimentary canal, and important because a correct knowledge of these causes enables us to recommend and adopt measures to prevent their recurrence, and difficult—perhaps not more difficult than other problems we have to solve—because we have no means of ascertaining the time when they first begin to form—the time when treatment would be most valuable; we seldom or never suspect their presence until they have attained such dimensions that they get fixed in a position to cause pain to the animal. Difficult also because our knowledge of the physiological and chemical processes which take place in the large intestines—the organs which, in my opinion, are chiefly involved, for I have never met with a calculus in the stomach or small intestines—is not yet perfect. I might also add that in this, as in other complaints of infrequent occurrence, we are seldom made acquainted with all the facts of the case, and our experience is insufficient to enable us to estimate correctly their separate or conjoined importance.

Causes.

A cursory examination of these specimens will lead us to the conclusion that different forces have been at work in their formation. Thus the forces which produce a phosphatic calculus differ from those which produce an oat-hair; whilst in the mixed we have a combination of both these forces more or less. In order to elucidate what these are we will make a close examination of the calculi themselves. If we cut a phosphatic calculus in halves we will find about the centre a nucleus around which the calculus is formed in concentric layers. The nucleus generally consists of a bit of iron, stone, India-rubber, or other material which in ordinary circumstances has no right in the alimentary canal. This section also throws considerable light upon the manner in which this kind of calculus is formed. The nucleus being swallowed

and neither digested or passed onwards has precipitated upon itself the constituents forming the calculus, the churning action of the stomach, or more probably the peristaltic action of the bowels, gives it a rounded shape. The layers, which can be separated, show that its size has been increased at intervals, each layer marking a period of time to estimate the length of which is mere conjecture. As a nucleus can be found in every phosphatic calculus I think it is only a fair inference that if there had been no nucleus introduced into the alimentary canal no calculus would have been found there. This however is too narrow a view to take of the subject, and compels us to accept as a theory that every time a horse swallows a bit of iron or other material capable of forming a nucleus, a calculus is formed around it. My own observations lead me to contend that this is not so, and unless the animal which has the misfortune to swallow a nucleus is fed upon a diet in which phosphatic and mineral salts are in excess, and is also affected with a condition of the alimentary canal commonly described as morbid, no calculus is formed. The nucleus produces no change in the contents of the bowels and is passed out of the body in the ordinary way. The diet referred to has, besides a fair amount of oats and beans, a liberal quantity of bran. The morbid condition of the alimentary canal I know very little about; I only know there is altered functions, and that instead of attempting to dissolve the nucleus or confining itself to its normal functions of separating and passing innutritious and used up material out of the body, it manufactures these monstrosities.

If we divide an oat-hair calculus we will find the cut surface presents a very different aspect to the phosphatic. There is first an absence of a nucleus; at all events I have always failed to find one. Then the material of which it is composed is not arranged in layers, it is simply a homogenous mass of oat-hair or similar indigestible matter, glued or cemented together by the juices of the intestines, and pressed into shape by the contraction of their muscular walls. Its rough external surface does not suggest to my mind that it has been moved far from the seat of its origin, at least it does not seem to have increased its size by being rolled about, like a snowball in the snow. The absence of a nucleus and the irregular shape which a number of them assume lead me think they are formed in a very different manner to that of the phosphatic. The material of which they are composed accumulates in a portion of the intestines and is there permeated with fluids of an adhesive nature. By-and-by the mass is moved by the action of the bowels, and the ends of the accumulation are pressed or doubled up, leaving a gap in the centre and in this shape it remains, the hardening process having taken place at this particular juncture prevents it being pressed into a spherical shape. It will thus be seen the causes leading to the formation of this kind of calculus are a diet in which the beard of oats is in excess, or fodder containing a plentiful quantity of woody fibre, and a morbid condition of the bowels. It strikes me that conditions similar to those which produce impaction of the bowels are at work in assisting to start the formation of an oat-hair calculus. I do not think I need take up your time by dwelling upon the formation of the mixed calculi as it would be a repetition of what has been said about the other two forms.

To sum up, the conditions I think favourable to the formation of intestinal calculi in the horse are:—

(1.) Diet. The drinking water may have something to do with it but I have never been able to trace this satisfactorily. In a phosphatic a diet rich in phosphatic salts, and in the case of an oat-hair a diet in which bearded oats or similar indigestible food is abundant.

(2.) The presence of a foreign body in the intestine to act as a nucleus in the case of a phosphatic or mixed.

(3.) A morbid condition of the alimentary canal which not only favours the

adhering of the constituents of the calculus, but also favours their retention in the bowels until they attain such a size that it is impossible for them to pass out of the body in the natural way.

Symptoms.

The symptoms exhibited by an animal suffering from an obstruction in the intestines caused by a calculus resemble those of colic and impaction of the bowels so closely that they may be considered identical. A high authority has said there are no symptoms diagnostic of the presence of a calculus, and with this opinion I agree. I do not wish it to be understood however that their presence is never recognised during life; on the contrary, this has been frequently done; I have done so myself and so have many others, but that conclusion has generally been arrived at from manual examination per rectum, or from previous knowledge and experience of the stud from which the patient came, rather than the symptoms displayed by the patient itself. In short their presence has been guessed at rather than accurately diagnosed. I trust the discussion which follows will assist us to differentiate, and if possible perfect a code of symptoms diagnostic of the presence of calculi. I say if possible, because I daresay you will agree with me it will be very unsatisfactory to define certain symptoms as diagnostic and relying upon these attribute an animal's illness to the presence of a calculus, only to find at the *post-mortem* that calculus conspicuous by its absence. My remarks therefore upon symptoms will be very brief, very general, and I fear you will consider them rather indefinite.

Horses which suffer from frequently returning attacks of colic are not, in my opinion, the subjects of calculus. The illness which they produce, although it may be protracted over several days or even weeks, has had but one termination—death. The chief and constant symptom is abdominal pain. This of course is attested in a variety of ways, by the animal going through certain movements and assuming certain postures with which you are all familiar, such as pawing, lying down, rolling, backing round the box, and occasionally sitting on the haunches. There is also tympany, at first slight but gradually increasing; there is no passage of flatus or fæces. The pulse, at first strong and full, as the case progresses becomes quicker and weaker, and finally imperceptible; the breathing becomes shorter and more distressed, and at last cold perspirations break out over the body, and death puts an end to the scene. I might add that you may have all these symptoms and yet the animal not be suffering from calculus. Occasionally you get cases where the symptoms of abdominal pain are not so well marked, and in these cases the calculus is generally found to be large. There is dullness, loss of appetite, with occasionally very slight colicky pains, etc., the animal dies suddenly. Some horses pass small phosphatic calculi in their fæces, but these give rise to no inconvenience to the horse; but why culculi, when they attain this size, are not always passed out of the body is a physiological question I cannot answer.

Treatment.

Treatment naturally enough divides itself into two heads—remedial and preventative. Of the remedial very little can be said; medicine can have very little effect in shifting these obstructions. Purgatives, laxatives, subcutaneous injections of physostigmine, the administration of alkalies, stimulants, and sedatives, are the medicines usually employed, along with copious and frequent enemas of soapy water and tobacco smoke. I need not remind you how often these fail to give relief. In my opinion nothing less than an operation will do so, and these, rather than twist, are the cases in which an operation is likely to be successful, and it may be that veterinary surgery may yet

claim the operation for the extraction of intestinal calculi as one of its triumphs.

If I have been correct in describing the conditions favourable to their formation, a good deal can be done in the way of prevention. With regard to the nuclei it has been found that iron is the most frequent. Where the provender is mixed and prepared on a large scale all little the bits of iron can be removed—and it is the little bits that do the mischief—by the use of an automatic separator. The separator consists of a magnetized plate and the iron is extracted as the food passes over it. Of course the accidental introduction of other foreign substances cannot well be avoided, but these cases are comparatively rare. Now as regards diet I have already said that I have found that where animals died from phosphatic calculi they have received a diet in which besides a fair quantity ot oats and beans there was a liberal supply of bran. Without entering into the chemical composition of the several articles of diet to show which contains in the greatest abundance the elements from which the calculi are formed, I will tell you my experience. The animal from which the 150 phosphatic calculi were taken, belonged to a firm which had previously lost several horses from stone; their stud was fed upon bran and beans, with as much hay as they liked to eat or waste. The quantity of bran would be about six or seven pounds per diem. This was altered; oats and maize were substituted for a quantity of the beans, and the quantity of the bran was reduced to rather less than two pounds per day. No case of phosphatic calculi has occurred in the stud since, and that is 20 years ago. Another case; a company had lost in the course of a few months about ten horses with phosphatic calculi; these horses were fed upon chaff, oats, beans, maize and bran; the quantity of the latter being at the rate of five pounds daily; this quantity was reduced to two pounds per day, an automatic separator was also used when the provender was mixed, and no death from phosphatic calculi has occurred since this change was effected, 15 years ago. Gentlemen, these cases speak for themselves; they require no further comment from me, and suggest one of the means of prevention. With respect to the oat-hair, I have very little experience with them but in my opinion the avoidance of excessive use of bearded oats is a good step towards prevention. If my theory is correct as to their formation, regular work will also be a good preventative, as remaining idle in the stable for several days will induce impaction of the bowels quicker than anything else.

I conclude with one general remark; a good prevention of this, as well as a number of other complaints, is to maintain the animals in good condition. The over-worked and under-fed animals will eat substances which produce injurious effects, and which the more regular fed animals would reject and leave in the manger, and so save himself pain and his owner loss.

Discussion.

Mr. ROGERSON thanked Mr. Butters for the very practical way in which he had dealt with the subject. He thought he had said nearly all that was necessary to be said, but he (Mr. Rogerson) had just jotted down a few points to which he would briefly allude. First with regard to the frequency of these concretions; he did not think they were sufficiently observant, as a rule, in making *post-mortem* examinations, and that many of these calculi were overlooked by them. They all knew how anxious knackers were to get hold of these calculi, because they could make a little money out of them by selling them to various individuals who were interested in these things. He had lost no less than ten horses during the last twelve months through the presence of calculi. Mr. Butters' estimate had generally exceeded the weight of those calculi found in his (Mr. Rogerson's) experience. The weight in the cases which had come under his notice was from 2lb. to 3lb.—4lb. at the

most. As to the composition of the calculi, the preponderance of the phosphates led him to suppose that the concretions were formed, in a great measure, by the material which the horses got in the way of food, more particularly bran, as that was composed very largely of salts. The situation also, he thought, was very important. Mr. Rogerson pointed out varioua specimens amongst the collection which he had assisted Mr. Butters in gathering as the kind of calculi which caused death. Most of the specimens shown were, he said, his. None of the concretions present which he indicated had been formed without a nucleus—either of gravel or granite. In one case a piece of india-rubber formed the nucleus. Mr. Butters had referred to a morbid condition of the intestines in cases of calculi. In this, Mr. Rogerson was inclined to disagree with him. In making *post-mortem* examinations in these cases, he had rarely found any morbid condition of the intestines, and very little inflammation at the seat where they were found. As to temperature, that was, in his experience, very little in excess of the normal. Concerning the duration of the symptoms, he found that they would last from thirty-six to forty-eight hours, as a rule. Mr. Butters had mentioned the examination of the rectum. By this method he (Mr. Rogerson) had not yet been able to reach the calculus. He had got a calculus into the floating colon, and been unable to pass it any further except a foot or two. Mr. Butters had referred to a very important point in connection with this disease —if he might so call it—and that was the operation of laparotomy. On one occasion he (Mr. Rogerson) ventured to perform that operation. The animal was almost at the point of death before he attempted it. The time was when the animal was lying down in the box. He secured the horse by means of hobbles and administered chloroform, and he made the incision in the region of the flank. He had frequently consulted various practitioners with regard to this operation, and had always been assured that it was impossible; that the moment one made the incision the intestines came out, and that they could not be got back again. That, however, was not his experience. He thought that if they were careful in the operation, careful in making the incision, they could get in their arm and manipulate the interior without any fear of the intestines rushing out. At any rate, in this way he found the calculus in the case he referred to. The mare died before he completed the operation. He passed his arm into the abdomen, got hold of the rectum, aud worked his way up until he came to the calculus, weich was where he expected to find it.

As to diet, he had a very great objection to the use of bran. It was largely composed of material that went to form these concretions. Nor did he think bran was a very nutritious sort of diet. Alluding to the automatic separator, to which reference had been made by Mr. Butters, Mr. Rogerson considered it a well-constructed machine, and that all large horse owners should adopt it. It was composed of a magnetised steel plate, through which the oats percolated, and which naturally collected the little bits—foreign bodies—contained in the food. He exhibited a specimen of the machine, which was not of English manufacture. Having obtained that specimen. he was curious to know how the nails produced got mixed with the oats. He made the discovery one day when he chanced to be in the company of an old sea captain, who told him that the nails were used for tacking the canvas round the vessel when oats were about to be shipped, the canvas used to prevent the oats from percolating into the crevices of the ship, and getting into the machinery.

Professor PENBERTHY said he had listened to Mr. Butters' remarks on a very important subject with the pleasure he always experienced in hearing addresses of the kind that were the result of real, practical observation. The subject had been dealt with from the most important point of view, namely,

of prevention. He thought they could pretty clearly understand from Mr. Butters that he was not at all certain about the cases in which calculi existed, that they had no means of positively ascertaining when these concretions existed; and that if they could settle the question of their existence by manipulation, he regarded the operation at present as a rather risky one. As far as prevention went he (Professor Penberthy) was entirely with Mr. Butters. As regarded the formation of a calculus and the conditions that favoured it he did not agree with Mr. Butters or with Mr. Rogerson. In the first place he did not think they could have a calculus without a nucleus, either an oat-hair one, or a phosphate one, or a mixed one. Everything must have a beginning and it seemed impossible to him to have a calculus without there being first a nucleus. In the case of an oat-hair calculus it was just possible that the material forming the nucleus was usually of the same nature as that of which the rest was formed. Again a little oat-hair or animal hair became mixed with material containing a large amount of phosphates and they got the formation of a nucleus. He did not think that the feeding of horses with bran favoured very much the formation of calculi. He quite agreed with Mr. Butters that the peculiar condition of the alimentary canal which he described led to the formation of calculus. Professor Penberthy produced a small nucleus which was not yet covered by the calculus. It was, he said, passed by a pony still living which had passed about twenty-three calculi altogether. This pony was one of nine others that had been fed for the last six years on absolutely the same food and the same water, and yet it was the only animal that had shown the slightest sign of calculus. Although the owner had fed horses in the same way during the last sixty-five years he had never anything indicative of calculus formation before. The habit of the pony was, when it was brought up to the door and its head was loose, to pick up gravel from the walk, and the nucleus produced was a bit of pebble. In order to understand how calculi were formed they must first determine whether the material which was fixed on to the nucleus was a body which was previously soluble or in solution, or was it deposited by chemical change, by an alteration in the chemical reaction or laid in as bran—something taken in as food. He thought bran might increase peristalsis, but that was altering the chemical constitution of the contents of the intestines which threw down the basic phosphates. Many of the phosphates were soluble. It was some condition special to the intestines which threw out by solution the salts forming the basic phosphate which was insoluble. Having regard to the large number of horses fed with bran and to the small number of calculi found in horses so fed, he did not think the solution of the problem as to the formation of calculi was to be discovered in a bran diet. His theory was that these concretions must either result from the habit of the individual in picking up the nuclei, or from some special condition of the intestines which favoured the deposition of the salt in the peculiar form in which they found it in the calculus. He thought it would be very difficult to feed a horse on bran and produce a calculus with any degree of certainty. Mr. Butters did not mention the immense calculi which had been found without giving rise to any symptoms whatever. He (Professor Penberthy) knew of calculi—eleven altogether—jointly weighing 37lbs., one of which alone weighed 26lb., and yet the possessor of this enormous calculus—the animal—never showed any symptoms of abdominal complaint during its life, and it lived fifteen years, dying eventually of pneumonia. The calculus found only after death, was worn down to the extent of two or three inches, and it included several metallic bodies. In this case he assumed that a pouch existed in the intestines which held the calculus and distended as the calculus grew, yet still allowing room in the intestines for food to pass over, and for the calculus to increase on its upper surface. It was, he thought, this pouch that caused the peculiar conformation of some of the calculi they

came across. He did not think that as a rule these calculi went any great length to and fro in the intestines. He agreed with Mr. Butters that they were very probably formed in some certain spot, the chemical reaction of which was peculiar. He did not know that he had any very strong opinion about the symptoms, but his experience certainly pointed to recurrent colic, and so strong was his opinion on that point that if an owner had a horse which had recurrent attacks of colic, he should advise him that it was likely that calculus would end the animal's life. He was not, however, at all certain about this. It did not follow that beeause a horse had a calculus it would necessarily die. Mr. Rowe and himself had had a case in point where a horse passed several calculi and yet lived. (Mr. Rowe: "And it has been sold since.") (Laughter.) Well, the principal point that he wished to bring before the meeting as a view of his own was that he considered the condition of the intestine, as the result of some chemical reaction which he could not explain, favoured the formation of calculi. They knew that the great acidity of the stomach in all probability prevented the formation of calculi there. What excited the chemical reaction or change in the intestine he did not attempt to suggest, but he believed the chemical reaction was such as to alter the reaction of the constituents and throw down the lime salts. So in the prevention of calculi as well as in the avoidance of nuclei he should advise all his clients, were he a private practitioner, that their animals must have tonic and alterative medicine very often. (Applause.)

Professor MACQUEEN complimented Mr. Butters on his very excellent paper. A more thoughtful production, he had not, he believed, listened to since he became a member of that Society. With regard to the frequency of intestinal calculi he believed that cases of the kind were not nearly so frequent as they used to be, and he thought that this was largely due to the greater attention which was paid to the preparation of the horses' food. As to the situation of the calculus, his opinion was that it was found in most cases in the colon, and when it moved it was found in the single colon. He had looked back for a good many years in the records of the profession and he had only found one case recorded in English veterinary literature where the calculus was in the cœcum. The French physiologist, Colin, made 900 *post-mortem* examinations, and in 20 of these he discovered the calculus in the colon and only one in the cœcum. Now, in this country they frequently found a calculus in the floating colon—the small colon, but the probability was that the calculus had been moved from its original position in the double colon. His belief was that the cause of the production of calculus of any form was to be found in the anatomical arrangement of the horse's intestines and the character of the material it took into its stomach. They might first have a depraved appetite or some other form of indigestion causing the animal to take into its stomach material that was not soluble. With regard to the production of phosphates tending to bring about the calculi as the result of the precipitation of salts, he maintained that most substances taken into the stomach contained those salts, and indigestion ensuing on this abnormal material they found in the anatomical arrangement of the colon, conditions favourable to accumulation.

He was of opinion that if there was one food more than another calculated to produce calculi it was bran. In this contentment he differed entirely from Professor Penberthy, notwithstanding that gentleman's elaborate statements with regard to certain basic phosphates, and phosphates that were not basic. He confessed that he could not follow Professor Penberthy in his organic chemistry on this point. It was a matter of no concern whether the phosphate was basic or not so long as they knew that bran contained a large percentage of them, or so long as they knew that bran was practically indigestible; that it passed almost entirely through a horse, lost some water in the process, but was certainly not digested. Professor Penberthy qualified his conclusions a

little by saying that if bran was given in proper quantity it would not be likely to do any harm. He quite agreed with him. As to symptoms he was sorry to say that he had never been able to discover any diagnostic symptoms of calculi. He was of Mr. Butters' opinion that every symptom failed. He agreed with Professor Penberthy when that gentleman said that recurrence of pain was strongly suggestive of intestinal calculus. In many cases within his own knowledge, where the animals were subject to repeated attacks of abdominal pain, the presence of calculi was never diagnosed during those attacks, but *post-mortem* examinations disclosed the existence of concretions. But in those cases there was, nevertheless, a suspicion of calculus, and treatment was directed to bringing about recovery, under the impression that calculus was the cause of the pain. Now the reason why a large calculus, say one of 25 or 30 lb., might not show any symptom of its presence was, as had been explained, the fact that it created a pocket for itself. A dilatation of the intestines occurred, and until a calculus was removed or shifted there were no symptoms. He believed that in some cases they actually succeeded in returning the calculus to its original seat—cases where recovery occurred.

His opinion was that all treatment should be directed to keeping the patient as quiet as possible with that end in view. Then as to the duration of symptoms, he had had one case where a horse lived twenty-three days. It did not eat any solid food during that time; but it drank, and received nutritive enemas. The symptoms continued during the whole of the twenty-three days. In referring to veterinary periodicals he found a case reported by Mr. J. Brown, of London, where a horse developed symptoms on January 1, and lived until the 7th of the next month, showing continuously meanwhile symptoms of abdominal pain. In that case a *post-mortem* examination revealed a calculus weighing 5 lb. in the single colon. In another reported case where a horse with a calculus lived thirty days after developing symptoms; one symptom was noteworthy, and that was that the animal during its entire illness never pawed the litter. Pawing the litter he regarded as a first rate symptom of intestinal calculus. Backing, he believed, was another symptom although that was not sufficiently distinctive. It was not by one symptom that calculus was to be diagnosed but by a collection of symptoms. He was very much in favour of rectal exploration not once, but as often as possible. Someone had said that they would never succeed in relieving an animal of rectal calculus. Well, he had removed calculi from the rectum by repeated exploration and injection with oil, and he did not know any better plan of diagnosis than by passing the hand up the rectum. He had always observed that a horse affected with calculus developed his symptoms slowly, gradually, became uneasy, remained uneasy, and never showed any acute symptoms until death was nearly approaching. As to treatment he agreed with Mr. Butters. It was advisable to look well after and superintend the preparation of the food. There was no doubt that the use of the automatic separator then exhibited was preventing a great many cases of intestinal calculus. In cases which were diagnosed he believed in the operative treatment which had been recommended, and he was glad to hear that Mr. Rogerson had attempted to relieve a case by laparotomy. In 1877 that operation was performed by Felizet, who thus abstracted from the colon of a horse a calculus the size of a child's head. The operation was perfectly successful. Professor Macqueen went on to say that he thought there was great scope for operative procedure in cases of calculus, but a condition precedent to this was that the cases must be first correctly diagnosed. This was their difficulty. Their only hope of real diagnosis was in repeated rectal exploration. If anyone could diagnose calculus it could only be done through the rectum, and the oftener rectal exploration was resorted to the better. As to the bowel coming out, that was of no consequence. They had had in another operation the escape of the

bowels. There was nothing to be afraid of on that score. If the bowels would not go back they could puncture them. The main thing was to diagnose a case early, before the patient got worn out. He was determined at the first opportunity when a case of calculus was diagnosed, that he would operate in spite of any other hindrance.

Mr. HURNDALL said one of the great advantages of that society was that they were able to air their various experiences, but it was singular how, after many years' practice, some of them differed on points in the way they did. He was rather surprised that from the remarks made by gentlemen of considerable experience in regard to calculi, none of them seemed to have been struck by one symptom. The symptom to which he referred had invariably been present in the cases which had come under his notice. It was the straining of the quarters against the wall. He did not mean to say that they never saw straining under any other circumstances, but straining with this disposition to pressure against the wall had invariably been observed by him on the part of horses ultimately found by *post-mortem* examination to have calculi. He perfectly agreed with Mr. Butters and subsequent speakers that the recurrence of pain of a very violent character was another symptom of calculus. A horse seemed to have pain coming on, and it passed off for a few minutes and then returned, but they did not see this indication of violent pain in a horse that threw itself about. It lay down, got up, turned round, looked at its side and gave evidence of pain, which appeared to be continuous, but which eventually subsided for a short time. He was partly disposed to agree with Professor Penberthy's views that there was a calculous diathesis, a tendency in the mucous membrane to deposit in chemical form an excess of phosphatic constituents which the system did not assimilate. He did not know whether that was putting it exactly as his friend put it, but that was the view which he took.

Professor PENBERTHY: That is not what I meant to imply.

Mr. HURNDALL said that was his own view of the question, and he thought, too, that bran was essentially an article of diet which was calculated to further that morbid condition; because bran, if he understood its chemical composition aright, contained a preponderance of phosphate. However that might be, they were confronted with the fact that horses fed on large quantities of bran were more often the subjects of calculi than horses which were not fed with bran. Although he agreed with Professor Macqueen that bran was not readily digested, and that it assisted in the formation of calculi without having undergone the process of digestion to any great degree, yet he thought that it was the phosphates that were more readily acted upon, and that had a tendency to deposit around the nucleus. Like Professor Macqueen, he had always made it a rule to make frequent rectal explorations, and it was his experience that on three or four occasions he had succeeded in removing calculi, some of which were about the size of his fist, he thought. He was surprised to hear Mr. Rogerson say he had never had a similar experience, because, as they were aware, in the class of horse with which that gentleman had to deal, calculi were more frequently met with than they were, perhaps, in animals of a lighter character. He would give them an illustration in confirmation of his view that horses fed largely on bran were more subject to calculi than horses otherwise fed. He was veterinary surgeon to a firm of brewers in Liverpool, who owned forty or fifty horses. Prior to his taking charge of the stud, they had been very much troubled with colic. A mare, soon after he had taken charge of the stud, showed symptoms which led him to conclude that she had a calculus. He told one of her proprietors so. She had recurring illness, and recovered after his treatment time after time, but ultimately succumbed after twenty-four hours' pain. The client was rather sceptical, and asked that his foreman might be present at the *post-mortem*

examination. He (Mr. Hurndall) consented. The result was the discovery of a calculus 7 or 8 lb. in weight. It was somewhat ofa honeycomb shape, with very large prominences, and they could readily understand that such a calculus very easily got fixed into a position whence it would be very difficult to remove. That case convinced him that without a surgical operation they could not hope for any good result unless the calculi were of such a size as to admit of passing on through the small colon. Mr. Butters was right, he thought, in recommending that other food should be substituted for bran. After the death of this mare, he suggested to the firm with whom bran was a ready article of diet, that they should not give their horses bran in such laage quantities. They asked him to formulate a diet, and he did so leaving bran entirely out of it. They reluctantly consented to adopt the diet he advised, but after it was adopted there was no other case of calculus in their stud during the five or six years he acted for them.

Professor PENBERTHY said he appeared not to have made himself plain and, therefore, he would try to explain his meaning better. He allowed that bran contained a large amount of material of which calculi were formed, and that if that material was not present calculi would not be formed. His idea was that a part of the alimentary canal got in such a condition as to favour the deposition of phosphate which was insoluble in the contents of the intestine —he would not call the phosphate "basic," if that word was objectionable. He could not forget that every horse had bands on its colon, and that the great majority of horses in Great Britain ate bran in small quantities. He took into account the habit of swallowing materials that might form nuclei, and he believed the great factor was the altered condition of a part of the bowel and its contents in favouring the condition he had mentioned. Although probably 79 per cent. of horses ate bran sufficiently to form calculi a very small proportion of these were thus affected; and bran alone he held could not produce the calculus unless the conditions were present which favoured it.

Mr. H. EDGAR said that personally he felt very much obliged to Mr. Butters for having introduced a subject that was interesting in more ways than one, because it seemed to him that they were still very far from being perfect either in the knowledge of the formation of these calculi or of the symptoms which they exhibited. Hence he thought that a discussion on such a subject must be of the utmost importance to all of them. Mr. Butters had noticed three forms or classes of calculi, to which he (Mr. Edgar) would add another that recently came under his observation. It was simply a compressed mass of fæcal matter, and it seemed to him that it was quite possible that some of those oat-hair calculi might be formed in a similar way. The horse to which he referred was ill, he thought, two days. It was in very violent pain—fearful pain. He did not think there was the slightest hope of recovery. At last the animal passed a mass of fæcal matter nearly the size of the smooth ball he saw on the table. It was as hard as it could possibly be, almost as hard as one of the oat-hair calculi which had been exhibited that evening. The horse was making rapid progress towards recovery, and he saw no reason why it should not recover when, on the following morning, to his astonishment, he found it was dead. In making a post-mortem he discovered another and a larger mass of fæcal matter which had formed a calculus almost within reach of one's arm, just at the end of the colon. One thing he was disappointed that Mr. Butters did not touch upon, and that was the length of time involved in the formation of these calculi. That seemed to him to be an important point. In the case of a horse of which he had experience where an enormous calculus was found after death, the animal never showed any symptoms whatever until the illness occurred which ended in its death within two or three days. The singularity of this case was that there was a sack of the bowel in which the enormous calculus had lodged, but from some cause or other—pro-

bably from the horse's rolling—it passed into bowel and blocked it. This horse belonged to a miller, and was one of twenty, all of which were largely fed on bran. The animal in question was, however, the only horse, so far as Mr. Edgar knew, which had calculus. The miller continued to feed his horses with bran, and had not had another case of the kind. He (Mr. Edgar) believed with Professor Penberthy that there must be some peculiarity of the system that favoured the formation of calculi. If bran were the sole cause of calculi they might naturally expect more than the very small percentage of such cases in horses largely fed with bran. The horse of the miller to which he referred was ten or twelve years old. The question was how long had the calculus been in it? Was it absolutely certain that these stones were formed layer upon layer from the outside, or was calculus an internal growth or enlargement taking place by itself? Were calculi produced entirely by deposit? He believed that they were, and that the growth was very rapid. In conclusion, Mr. Edgar moved the adjournment of the discussion.

Professor MACQUEEN: I shall be glad to second that, but not with the intention of speaking again. However, I hope to be present at the next meeting.

The motion having been adopted, a vote of thanks to the chairman—moved by Professor PENBERTHY and seconded by Mr. HURNDALL—concluded the proceedings.

An ordinary general meeting of the Society was held on March 1st., at the Royal College of Veterinary Surgeons. Mr. A. Prudames, the president, occupied the chair, and the other Fellows present were Messrs. A. L. Butters, R. Butler, A.V.D., Jno. A. W. Dollar, Henry Edgar, A. E. Gosling, Thos. C. Garry, J. Sutcliffe Hurndall, Professor F. Hobday, W. Hunting, R. C. Irving, J. Kettle, A.V.D., F. W. Kendall, Prof. Macqueen, F. C. Mahon (hon. sec.). P. McOnie, Prof. J. Penberthy, F. Raymond, A.V.D., H. G. Rogers, W. Roots, J. Rowe (hon. treas.), W. Stapeley, H. Singleton, and W. Willis; also the following visitors, viz., Messrs. Morgan, Evans, W. Robertson, C. J. Reakes.

Letters were read from Professor Walley regretting his inability to attend, and from Veterinary-Captain Raymond, announcing his intention to retire from the Council at the end of the professional year.

The Defence Society.

The HON. SECRETARY stated that in accordance with Mr. Hurndall's resolution passed at the preceding meeting, he had sent 110 postcards to different gentlemen individually, and to the veterinary societies of Great Britain and Ireland, asking whether they were prepared to support the National Veterinary Benevolent and Mutual Defence Society providing the two objects of the society were kept separate and distinct, and that subscriptions given for the purposes of defence should be solely applied to those purposes, the defence fund being unlimited in amount. He had received replies from 23 gentlemen intimating their willingness to contribute to the Society if it were re-established on this altered basis. As to six other answers to hand it appeared that the writers did not see their way clear to a distinct separation of the objects of the Society named. He had replies from six veterinary associations promising to lay the matter before their respective societies, namely, the Yorkshire, the Southern Counties, the National, the National Benevolent and Defence, the Lancashire, and the Midland Counties.

Mr. ROBINSON, secretary of the Lincolnshire Society, wrote:—"The subject of the proposed alteration in the constitution of the N.V. Benevolent and Defence Society was considered by my society at its meeting on the 22nd February. There was a general expression of opinion in favour of the proposed alteration and, therefore, I am directed to say that if a new association

be formed on the lines suggested by the Central V.M.S. we are prepared to give it practical support. It was thought that in any negotiations with the existing society every consideration should be shown towards an Association that has been of considerable advantage to the profession, and that an alteration in the basis of that society would be preferable to joining a new association."

Mr. B. FREER, Uppingham, wrote stating that "he was already a member of the N.V. Benevolent and Defence Society, but he did not see why the two things (benevolence and defence) should be kept separate. At the same time he hoped that the existing association would be strengthened by the addition of new members rather than a new society should be formed."

Mr. SHEATHER, Regent's Park, wrote that as a member of the N.V. Benevolent and Defence Society he recognised the need of a defence fund absolutely dissevered from a benevolent fund, remarking that while the rules of the society admitted of a transfer of money from the defence to the benevolent fund there could be no reverse transference.

The HON. SEC. had also received a communication from Mr. James Douglas Stewart, who wrote from New South Wales:—"Dear sir, would you be good enough to forward me a copy of the rules and regulations of your Society, in order that I may be guided by them in my efforts to establish a veterinary medical association in the colony of New South Wales."

The CHAIRMAN:—I think there can be no objection to comply with Mr. Stewart's request. It is rather an honour to know that our kinsmen across the sea so much value what we do here that they would like to follow in our footsteps.

The Hon. Secretary was directed to comply with Mr. Stewart's request.

Election of Fellows.

A ballot resulted in the unanimous election *en bloc* of the following gentlemen as Fellows of the Society: Mr. W. H. Williamson, M.R.C.V.S., Willesden Lane, N.W.; Mr. T. Wooff, M.R.C.V.S., Greenwich; Mr. Craft, M.R.C.V.S., 24, London Street, Reading; Mr. S. L. Stephens, M.R.C.V.S., Royal Veterinary College, N.W.; Mr. C. H. Cordy, M.R.C.V.S., 382, City Road, E.C.; and Mr. P. Easte, M.R.C.V.S., 96, Gray's Inn Road, E.C.

Nomination,

Mr. H. H. Whitlamsmith, M.R.C.V.S., 419, New Cross Road, S.E., was nominated for election as a Fellow.

"INTESTINAL CALCULI OF THE HORSE."

By A. L. BUTTERS, M.R.C.V.S.

Resumed Discussion.

Mr. H. EDGAR said there were one or two points to which he desired to allude which time did not permit of his mentioning at the previous meeting. He had unfortunately omitted to bring with him the specimen in the case to which he had previously adverted. That large calculus when taken from the horse weighed 28lb., and afterwards by evaporation of moisture 26lb., and it measured in diameter 6 inches one way and 7½ inches the other. The horse, so far as he had been able to ascertain, had only one attack of illness two or three days before it died. It was in constant work. It belonged to a miller who fed it with a good deal of bran as he fed his other horses both before and since the death of the one in question, and yet he never had another case of calculus. Pretty unanimous evidence went to prove that there must be a foreign object to form a nucleus and there must be a material to add to that nucleus until it developed into a calculus. This had special reference to phosphatic calculi. A third cause was, it seemed to him, necessary to account

for calculi and that was some abnormal or morbid condition of the intestines predisposing to their formation. Unquestionably the evidence was not sufficient to enable them to say that, without this morbid condition, horses fed on bran would have these stones formed in their intestines. If eight or ten cases of calculi occurred in bran-fed horses within a few months and then no more cases followed, even though the quantity of bran subsequently given was reduced, bran could hardly be said to have caused the calculi entirely. Of course they were agreed that bran was an article of diet which contained more phosphates than any other food possibly could, and for that reason it must accelerate the growth of calculi. With regard to the length of time it took for these stones to develop they were at present utterly in the dark. They knew not whether it took weeks or months. In the case of oat-hair calculi, Professor Penberthy was of opinion that they arose from a centre—from nuclei. He (Mr. Edgar) thought otherwise. It seemed to him that a compression occurred somewhere in the bowels so as to produce calculi, otherwise he did not see how these markings or convolutions which they noticed in these stones were formed in them. As to symptoms he had never been able to say that there was any one particular symptom diagnostic of calculi. The one noticed most was probably the sitting on haunches, but then the same thing was observable in other cases of abdominal lesions where calculi were absent. He had also noticed the symptom described by Mr. Hurndall, that of straining against the wall but this, too, was done in other cases. The only certain way of diagnosing calculi seemed to him to be by rectal examination. With respect to treatment, of course that must depend upon the nature of the case they had in hand. As to operating, he asked whether a private practitioner would be justified in advising his clent to put his horse under an operation for the removal of intestinal calculus. This was the important point they had to consider; not what they would like to do but what must be their advise to their clients. If they said "Undoubtedly this horse has calculus, and the best thing is for it to be operated upon so that the calculus may be removed," and if they got their client's consent to the operation, what was the prospect? In all probability the horse would die. Of course, where gentlemen had large studs under their entire charge, or were veterinary surgeons in the army, they were able practically to do as they liked. Not so the private practitioner. As to other treatment, he had on one or two occasions tried an injection of eserine, but not with very satisfactory results. With regard to indigestion, were they of opinion that indigestion was the primary cause of these calculi forming? Was it the morbid or abnormal condition of the digestive organs which accelerated the formation of these calculi, or did the calculi produce the indigestion. It was not always in the poor emaciated animals that these stones formed. He had known calculi in horses that were fat and in apparently remarkably good condition—horses that seemed to be doing as well as they possibly could.

Captain RAYMOND said that Mr. Edgar asked whether in the event of calculus being diagnosed in the bowels a veterinary surgeon would be justified in advising his client to have an operation performed. Well, it seemed to him (Captain Raymond) that in certain circumstances it was about the only thing that could be done, but it was not a thing that he had ever done himself. Suppose they had a large calculus which blocked the circulation in some part of the intestine, and they diagnosed the case and felt sure that the calculus was there. Suppose their client said "What shall I do, the horse is going to die." Well, it seemed to him that in such an emergency they were justified in saying, "Well, there is just a chance of the horse pulling through if I operate upon it, if I open the abdomen and attempt to remove the calculus." That was the ultimate limit they had yet reached in abdominal

surgery. Perhaps in course of time, with better practice and better notions, they would be able to operate more effectively. He did not see why they should not.

Mr. DOLLAR said he was sorry that he had not been present at the last meeting when Mr. Butters introduced the subject of intestinal calculi in the horse, and that he had not followed the discussions so closely as he coutd have wished, nor could he, from his own personal knowledge, hope to throw much direct light on the subject. An experience which he had whilst in France might, however, be of some slight value. The point to which he desired to refer was the surgical method of procedure in, and the precautions required by, an operation such as had been forecasted by Mr. Edgar and also by Captain Raymond. He saw Professor Cadiot operate on a dog which had swallowed a large stone. The usual symptoms of obstruction of the bowels had supervened. They commenced with colicky pain and weak, frequent, running down pulse, so that the animal, about twelve hours after the accident showed signs of collapse. At that time it was brought to the clinique. It had been seen to swallow the stone, and so no doubt of its presence existed, and Professor Cadiot determined to immediatety perform laparotomy. The rectum was first cleared as far as possible, and attempts made by inserting the finger to establish the position of the stone in the abdomen. That, however, was found impracticable and it not being possible to feel the stone from without through the walls of the abdomen it was concluded that it was very far forward at some point within the small intestine. The seat of operation was well forward in the abdomen. After thoroughly cleansing the parts and shaving off the hair, the neighbourhood was washed with soap solution, then with ether and alcohol, and finally with sublimate. The skin was next divided, the abdominal muscles broken through with the fingers and the peritoneum incised. A finger being inserted, the stone wes found after a little manipulation and the loop of bowel containing it drawn forward. The intestine was laid on cloths soaked in sublimate solution. It was next incised in its long diameter and the stone removed. This measured about an inch and three-qnarters in length and about three-quarters of an inch in circumference. Then the bowel was thoroughly cleansed, emptied as far as possible of its contents and a ligature applied to the portion in front of the point operated on, in order to prevent the contents of the afferent part of the bowel passing through prematurely, and soiling the wound. The latter having been thoroughly cleansed, the edges were brought together with bichromatised catgut, care being taken that the free edges of tbe bowel were not simply brought into apposition, but that each was doubled in towards the lumen of the tube to a slight extent before the sutures were inserted. In that way the serous coat of one edge lay in contact with that of the other, in a direction perpendicular to the circumference of the bowel. That precaution was necessary in order to preveut egress of the bowel contents. The wounds in the abdominal walls, the muscular and skin wounds were then brought together. After disinfection, the parts were powdered with iodoform and tannin, and a dressing of sublimate wool was applied over the whole wound. The animal received a large dose of opium in order to keep it as quiet as possible. Recovery appeared to be complete within about fourteen to twenty days. The bowels acted, he believed, on the fifth or sixth day. The animal was kept entirely on a milk diet after the operation, and the first dressing was not removed for three days. There was a slight rise in temperature—a rise of $1\frac{1}{2}$ or two degrees a day after the operation, but that gradually subsided, and the animal within three weeks appeared to be completely recovered. He believed that in these cases some difficulty was occasionally experienced, apart from the danger of peritonitis, in securing union of the abdominal walls, but in this case union was quite perfect. The reason he mentioned these details was to

show that it was possible, in the dog at least, to successfully effect laparotomy where considerable disturbance already existed, and all that was requisite was the thorough carrying out of antiseptic precautions.

Vet.-Captain RAYMOND: May I just ask a question? I did not quite catch whether you told us where the incision was made in the abdominal walls; and another thing I would like to know as to the manner of the suture in the intestine, what kind of a suture did you put in?

Mr. DOLLAR: The suture, I believe, was ordinary suture, but the stitches were inserted very close together, and the one of ordinary catgut was ample; the incision was slightly to the right side of the "linea alba," and began just behind the ensiform cartilage, and was carried back for a distance of about three inches.

The CHAIRMAN: One question I should like to ask Mr. Dollar. I did not notice whether he told us when the ligature used round the bowel to prevent the fœcal matter passing was removed.

Mr. DOLLAR: That ligature was removed immediately after inserting the sutures into the bowel itself.

Vet.-Lieut. E. R. C. BUTLER said that at their previous meeting, Mr. Rogerson gave them a description of how he operated upon a horse and, although the animal did not recover, yet he completed his operation, and established the correctness of his diagnosis. That he (Mr. Butler) thought was as far as they had got in the horse as yet with regard to these intestinal calculi. He had assisted at certain operations regarding the abdominal cavity in army horses, and it seemed to him that they had insuperable difficulties yet to overcome. The first great difficulty was the position of their wound. The French, he believed, had had great success in operating in certain cases through the vagina, but in the male that did not apply. Sometimes the incision was made through the flank between the last rib and the antero-inferior spinous process of the ilium. That, he thought, was the best position. On the dissecting-room table it was a very easy matter to make that wound successfully through the abdominal walls, and the depth to the peritoneum was from half to three-quarters of an inch, but in the live subject, if they operated between the last rib and the angle of the ilium, the thickness they had to penetrate was about twe inches to the peritoneum. This greatly increased the difficulty of the operation; moreover, the muscles there ran in two directions wherever they operated in that region, and being only separated by loose connective tissue, the slopes of the abdominal muscle formed very readily pockets for any discharge that came away from the wound; and in a wound of such magnitude it was not possible to do without any discharge. The position for a successful incision appeared to him to be, therefore, at the point previously mentioned. From one or two cases in which he had had experience, he found there was no great difficulty in such an animal as a dog, in opening the abdomen and successfully closing it again; but in the case of a horse, they had to contend with the great weight of the intestine. If they could manage to keep the abdominal walls in the position described, and also open on the median line, he thought they would be taking a great step forward. How this was to be done he did not see at present. Mr. Dollar had mentioned that a large dose of opium was given the dog to which he referred, but such treatment was not necessary in his (Mr. Butler's) opinion. A dog, after such an operation, would recover very well without opium, and by means of a simple suspensory band round the abdomen. What he wished to invite opinions upon was whether it was possible, under any circumstances, to open at the median line in the horse, and close it successfully again. They knew that a slight support would sustain a large hernia for instance, and if they could by means of bandages so sustain it, he was not at all sure that they could not do so in the case of an operative wound. When the

opportunity offered, he intended trying this experiment, and he would report to them the result.

Mr. ROBERTSON related a case of which he had personal experience, where a successful operation of laparotomy had been performed upon a young retriever, the case resembling in many respects that mentioned by Mr. Dollar.

Professor PENBERTHY said that experimental research had proved that, with ordinary care, they might do almost anything to the peritoneum of the dog. Laparotomy in the dog had, he believed, been performed many thousands of times; the dog was the subject chosen to carry out the experiment of cutting into the intestines; and indeed, experimenters had found the dog a capital patient. There were varying degrees of susceptibility of the peritoneum, and he believed that the horse's peritoneum was one which was more susceptible to inflammation than that of the dog, and that of the sheep more than the horse, while the peritoneum of the ox and the pig had little or no susceptibility at all. It did not matter what dirty farrier put his dirty finger into the peritoneal cavity of the pig, or whether the intestines came out on the litter or not, the pig nearly always did well. If they opened into the flank of the cow and let some of the ingesta escape into the peritoneal cavity, they found comparatively little harm done. He had, however, always understood that the peritoneum of the horse would not allow of any such interference. Abdominal surgery in the human subject had reached such a pitch that people said that with human beings almost everything could be done if ordinary cleanliness was observed, but he did not think they could make a direct inference from the dog to the horse, or reason exactly on the same ground. He thought that this might prove a little dangerous, independent alike of dealing with the weight of the intestine or the wound. Personally he should countenance the operation as a last resort, and he believed that some of them would have an early opportunity of performing it and reporting the result. So far as he could gather successful operations in the case of the horse had been very few. He believed that Professor Macqueen had been successful in one operation. Notwithstanding what had been said about it, he thought that it was likely that the peritoneal cavity in the horse might be opened, and successfully, and the calculus removed, but diagnosis would, in his opinion, constitute the great difficulty. A sharp knife could cut anything, and cleanliness assisting nature would bring about almost any repair. He considered that diagnosis would be the bugbear so for as this operation was concerned.

Professor MACQUEEN said, he should first like to add a word or two in support of early interference in all cases of bowel obstruction in the horse, when the condition was diagnosed. He did not belong to that party who believed that the horse's peritoneum was more susceptible to damage than any other. If they compared the operations involving the peritoneum of the horse with similar operations in other animals they would find the percentage of such operations in the horse extremely low. To discourage operation because of suspected greater susceptibility of the horse's peritoneum to disease or irritation, was to go beyond the facts of the case. They knew perfectly well what could be done in the pig, and in the dog, but, excepting operations on the womd of the mare, how many times had the peritoneum of the horse been interfered with? It was scarcely fair to class cases of difficult foaling requiring embryotomy—as examples of peritoneal surgery. In bowel obstruction the patient was not in the same condition as a mare that had been struggling to foal for some hours. Coming to the more direct application of abdominal surgery as in the castration of abdominal cryptorchids, Professor Macqueen said he had had a little experience in that operation, and he must say that the horses did not suffer remarkably, and he had brought part of the bowel ontside frequently without having lost a case. He believed there was no danger so long as strict

cleanliness was observed. If ingesta escaped into the peritoneal cavity he had no doubt there would be greater danger. He did not agree with the statement that the proper region for laparotomy was the abdominal floor. He believed that success would attend the operation if conducted high up, because the natural support of the abdominal wall would be gained, and there would be less danger of hernia.

The PRESIDENT: Before calling upon Mr. Butters to reply to the criticisms on his able and practical paper, I will take the opportunity of thanking him. It has called forth a good discussion which has cleared some obscure points and fixed other well-known facts upon our memories. While agreeing with Professor Penberthy and other speakers that a special diathesis must be in existence, indeed necessary for the formation of intestinal calculi, there must also be the materials present for their formation, and in every well-authenticated case I have known it has been derived from bran, although it does not therefore follow that every animal eating bran must have calculi. The same speaker stated that 79 per cent. of horses were fed upon bran, but I do not think this is applicable to horses fed in the country, certainly not in that part in which I reside; this may account for the comparatively few cases met with there. My theory of their formation is that some animals possess a special power to dissolve the phosphates by means of an excess of alkali without a counterbalancing one to assimilate them, thus we have a saturated solution which readily precipitates or crystallises around any nucleus which may be present. The time occupied in their formation must depend on circumstances, particularly those associated with diet. All appear agreed that the difficulty of diagnosis is great, although a combined set of symptoms with the history of the case may lead us to form a correct one very frequently, but we shall not be always right. I have met with a form of calculus-like deposit to which our essayist has not alluded. It occurred in an aged grey mare, the property of a miller. There were the usual symptoms of impaction of the bowels, but without an inflammatory condition; on examining her rectum found a mass of densely-impacted, sandy material, made up of the same phosphatic substance as a true calculus. Although I succeeded in removing a considerable quantity I was unable to effectually clear the passage; after three days' treatment advised slaughter. In making the *post-mortem* found more than a foot of the small colon tightly impacted with the same substance. I will now ask Mr. Butters to reply to the remarks of the previous speakers.

Mr. BUTTERS in reply, reminded the Meeting that he had always regarded his paper as simply introductory, therefore he claimed absolution for having omitted some points which had been raised during the course of the discussion. To have dealt with the subject of intestinal calculi in the horse exhaustively would have required a paper four times the length of his, and even then, the theme might not have been exhausted. Mr. Edgar and the President had related interesting cases in which they considered they had found a form of calculi which he had not mentioned With regard to Mr. Edgar's discovery of an obstruction formed by a mass of hardened fæces, he (Mr. Butters) hardly thought this came under the head of calculi. Defining calculus as "lime" or "chalk stone," he scarcely thought the word covered an accumulation of hardened fæces. If the mass was due to the action of phosphatic salts then it would come under the head of mixed calculi—a very elastic term. Mr. Rogerson was somewhat sceptical as to oat-hair calculi forming without the aid of a nucleus. He knew that Mr. Rogerson had devoted considerable time and study to this subject, and he was not only much indebted to him for the loan of many specimens, but also for many valuable hints, for the manner in which those specimens were prepared, and for the way in which he searched for nuclei and found them. Still he, (Mr. Butters) adhered to his opinions and regarded oat-hair calculi as simple accumulations occurring in the large

colon somewhat similar to those that gathered in the small colon; but it might be, as Professor Penberthy pointed out, that it was not always necessary that the nucleus should be of a different material to the calculus itself. He, (Mr. Butters) thought that in all cases of oat-hair calculi they would find the calculi mixed with phosphates. He held that these could not be formed without a nucleus of a more or less chemical composition, and that they were occasioned or determined by the presence of the nucleus. Mr. Edgar mentioned the case of a horse which was one amongst many fed entirely on bran, and was the only horse in which a calculus formed. This was an instance in which no doubt, the conditions were favourable to the formation of calculi. They might give an animal bran all its life and yet not have a calculus unless there was a nucleus, and also a calcareous diathesis. What that was they hardly knew. Professor Penberthy had explained it to some extent, as had also their President. He thought they might leave the matter where it was—as a morbid condition of the alimentary canal. That there was this condition there could be no doubt, as shown by the fact that although some groups of horses had other conditions present, yet it was only here and there one that developed calculi. Mr. Edgar asked as to the time which it took these calculi to form. He (Mr. Butters) could not say. He might, however, tell them that a week or two ago he was shown a large phosphatic calculus weighing, perhaps, 4lbs. taken from a two-year old filly, which had the misfortune to have its leg broken and was destroyed in consequence. This calculus was discovered in the large colon. He thought whenever they had a fact like that, they might calculate that the length of the time needed in the formation of calculi might be limited to months. It was quite evident that in this case the calculus had been only a few months in forming. It was a well formed phosphatic calculus with a small piece of iron for its nucleus. Then with regard to symptoms, Mr. Butters agreed with Professor Macqueen and Mr. Hurndall, that one symptom very frequent in all cases of obstruction of the bowel, was the animal backing and resting its quarters againt the stall-post or wall of the stable; but he did not regard this as peculiarly diagnostic of calculus, as they got this symptom in cases of ordinary impaction of the bowels. He agreed with Professor Macqueen that it was not by one symptom, or two, but by a combination of symptoms and to a certain extent by the history of the progress of disease, that the presence of calculus was to be diagnosed. Even then they were apt to be mistaken, for sometimes animals which passed no fæces for three or four days showed all the symptoms of calculi, and yet the *post-mortem* examination revealed no calculus. He was much struck with an observation of Mr. Rogerson relating to *post-mortem* examinations. That gentleman considered that they were not observant enough at those examinations with a view to the discovery of calculi, and he was of opinion that knackers were very ready to annex anything they found which was likely to have a marketable value. Mr. Butters quite believed that cases of calculi were more frequent than they were aware of. The subject of operating, which he had merely mentioned in his essay, had been discussed and developed to a greater extent than he expected. He would not add anything to what had been already said. He was much obliged to Mr. Rogerson for giving them an account of how he operated, but could have wished that the details had been fuller. The fact that he had been able to remove a calculus from an animal during life proved that the thing could be done, and, further, the case quoted by Professor Macqueen, who had operated successfully upon a horse, must always afford them encouragement, for he held this: If it was possible for one man to successfully perform an operation, it was quite possible for another man to follow in his footsteps.

Captain RAYMOND moved a hearty vote of thanks to Mr. Butters for his very able paper, remarking that he had derived considerable benefit from the

debate that evening. With regard to operative surgery of the abdomen, he had acquired a great deal more knowledge that night than he could have gleaned by many days' reading of books. If it so happened that he came across a case of calculus, a suitable case in which to operate, he had made up his mind from the information he had gained, to attempt the operation. If he had not been present that evening to hear the discussion, he should not have thought of doing so.

Mr. HURNDALL seconded the motion, which was unanimously passed and suitably acknowledged by Mr. Butters.

Clinical Specimens.

Vet.-Lieut. E. R. C. BUTLER then introduced some matters of clinical interest, producing and explaining specimens and photographs.

After a short discussion in which Mr. Rowe, Captain Raymond, and Mr. Hunting took part, the subjects were, on the motion of Prof. Macqueen, seconded by Mr. Stapley, deferred for further consideration until the next meeting.

A Question of Professional Etiquette.

Professor MACQUEEN asked that Mr. Hurndall might be allowed to mention a breach of professional etiquette committed not by a member of the veterinary, but of the medical profession.

The CHAIRMAN said that having regard to the late hour, and to the fact that another meeting was about to be held in that building which gentlemen present desired to attend, it would be better if, after Mr. Hurnall had made his statement, discussion was postponed till the next meeting of the Society.

Mr. HURNDALL said he thought that the matter which he desired to bring under their notice was deserving of attention, because he had always understood that there were certain unwritten rules of etiquette which veterinarians observed in relation to the medical profession, and which they expected to find reciprocally observed by the latter. He reminded them that last year's Waterloo Cup was won by a dog called "Character," belonging to Mr. Coke, of Birkland, near Southport. Up to a certain point a few weeks ago, that dog stood favourite in the betting for this year's Waterloo Cup. The dog after running a week, ran in his gallops against a projecting branch in a thorn-hedge and scratched the cornea of his left eye. This resulted in some serious inflammation which was treated, according to the *Sportsman*, by Mr. Coke or some of his subordinates. Things, however, became more serious, and through some cause or other the owner of the dog was induced or led to consult Dr. Williams, of Liverpool, a somewhat eminent ophthalmic surgeon. The case was gone into by him, and he called into consultation Dr. Bickerton of Liverpool, also an ophthalmic surgeon. The dog was subjected to chloroform, and to an operation. Mr. Hurndall explained that his information was solely derived from the writings of "Vindex," the coursing contributor to the *Sportsman*. The dog was put under an operation the nature of which did not transpire. Still things did not proceed satisfactorily, and the dog was ultimately brought to London to Sir George Critchett. Well, in all the reports relating to this dog and its treatment no mention was made of any veterinary surgeon having been consulted. He waited with some interest to ascertain what was the result of all that had been done to the dog. On the 17th ult., "Vindex" reported that the dog's eye had been removed. He (Mr. Hurndall) after consulting with Mr. Hunting, Professor Macqueen, and Mr. Rogers, and others whose names it was not necessary to mention, decided to take some public notice of this matter, as they were all agreed that the medical profession had been guilty of a breach of etiquette. Personally he felt strongly on the subject, and on his own responsibility wrote a letter to the *Sportsman* which appeared in that journal

last Saturday. He also wrote to the *British Medical Journal* but had since learnt that he had posted it too late to admit of its insertion in the last issue. They would see whether it appeared on the next Saturday. These were really the whole of the circumstances, and he thought he would like to take the feeling of that society as to whether they approved of what he had done. Of course what he had done had been purely a personal matter up to that time. He had detailed the circumstances to the Royal Counties Veterinary Association at their meeting at Reading on the previous Friday, and the members present were unanimous in expressing the opinion that he had acted in the interests of the veterinary profession, and that it was right that notice should be taken of the matter. If the thing were allowed to pass in silence, it was felt that similar conduct might be pursued in future, and that silence would imply a passive recognition of the right of the medical profession to interfere with matters that were purely veterinary. They would note that Mr. Coke had not gained anything by his cleverness, inasmuch as the dog had lost its eye, and he (Mr. Hurndall) certainly could not see any just reason or cause why it should have done so had the animal been properly treated in the first instance. His letter to the *Sportsman* dealt with this subject. In it he said that it was desirable, if this practice were to continue, that the veterinary profession should know whom of the medical profession they might expect to have to compete with. He mentioned that the medical gentlemen in question trod where angels feared to go, inasmuch as they administered chloroform—a very dangerous thing to do. He cautioned them that in the next case of a like character they might lose their subject altogether under the influence of the anæsthetic. He should be pleased to hear, then or on some future occasion, whether his professional friends concurred in the steps he had taken, and whether they believed he had consulted the interests of their profession in calling public attention to this matter.

Professor PENBERTHY: I propose the adjournment of the discussion of this matter as an open subject. I should like, while doing this to know if there is any method of finding out whether fees were received by the medical men in this case. If so it is just possible that the attention of the Medical Council might be called to the circumstances. Anybody can operate on dogs—it doesn't matter who it is.

Mr. HURNDALL stated that up to the present he had been unable to ascertain whether any fees were paid or not, and now that the question had been brought before the public, he was afraid the task of discovering this would be rendered still more difficult. He might, however, say that he did not think Mr. John Coke was a man to receive services from anyone without paying for them, nor did he think that the medical men consulted would have gone to the trouble they did merely for the sake of making an experimental operation.

Mr. DOLLAR seconded the motion, which was agreed to, and a vote of thanks to the Chairman ended the proceedings.

NORTH OF ENGLAND VETERINARY MEDICAL ASSOCIATION.

(*Continued from page* 287.)

IN the horse and most of the higher mammifers the nervous system is highly developed, although the brain weight in proportion to body is much less than in man (being in the horse 22 to 23oz.; ass 12 to 13oz.; ox 17oz.; sheep and goat 4oz.; pig 5½oz.; dog 6¼oz.; cat 1oz.; rabbit ¼ to one-third oz.), but sensibility to pain varies in animals almost as much as in man, and the difference may be as wide as that observed between the savage and the highly neurotic; some being intensely sensitive to special forms of pain, others equally indifferent, while representatives of each extreme may prove

equally prostrated by another local form of pain which all equines bear badly. Such cases are within the experience of all veterinarians who practise surgery. Take, for instance, the application of actual cautery, without anæsthetics. I have seen some animals submit to the operation almost without a struggle while others, even under the influence of chloral or equally strong sedative, struggle violently at every fresh line made on the skin. The same difference may be observed in applying sutures to the skin after injuries, the simple prick of a needle through any attached portion of skin will make some horses struggle all over the operating room, others will bear a number of sutures under the counteracting pain of the "twitch" with comparative quietude, while a few patients may be sewn up without any resistance whatever beyond contraction of the panniculus muscle. All these animals would express equal agony in an acute attack of enteritis or torsion of intestine.

It must be recognised for purposes of comparison that animals are, under excitement, fear, or when heated from exercise, less sensitive to pain than when in a state of rest. Also that the skin is much more sensitive in some parts of the body than at others, the region of the withers being probably most so. Some animals become intensely vicious from the pain caused by a collar pinch or sore wither, and often never forget an injury in that region, being easily induced to exhibit vice when touched at the seat of the well-remembered injury. Other tissues of the body are very painful when injured or inflamed, *e.g.*, tendons ligaments, muscles, and periosteum, manifested by resistance to pressure upon the painful part. The attacks of flies are variously borne by different animals, some being almost unmanageable from their stings, while others allow them to swarm over legs or face, being contented with an occasional stamp of the foot or whisk of the tail to remove them. Sensibility to the lash, as is well-known, varies greatly in different horses quite independently of their blood or breed. A thoroughbred may be a veritable drone, as indifferent to the lash as the too frequently libelled donkey, while an underbred mountain pony will evince intense dislike to the whip, and exhibit indomitable courage under fatigue rather than submit to its application. The foregoing qualities are usually referred to the presence or absence of courage or pluck and the animal is said to be "thin skinned," "high couraged" or a "plucked 'un" etc. in proportion to its willingness to expend its energies freely. Every breeder knows that pluck is a transmissible quality generation after generation, and it often counterbalances points of contour or soundness of constitution in the election to breed from an animal; this is equally true of nervousness, timidity, temper, etc.

The effect of the lash affords an example of an animal being influenced by emotion which may dominate over pain. The fear of the lash probably rather than the actual pain produced by its administration causes the animal to submit to extreme fatigue, and sometimes forget the pain causing lameness; for under extreme excitement from a severe whipping an animal may for a time travel soundly. The same thing may happen when a horse is suddenly startled by a railway train or other common cause of fright.

Comparably with man, horses bear gastric and enteric pain very badly, but this is probably the only exception in favour of man.

Pain in some regions of the body is evidenced with equal intensity in almost all animals. Take, for instance, an injury to the laminæ of the terminal digits. Viewed anatomically, nothing in man can be more delicate or perfect than the distribution of the blood vessels and nerve endings in the laminæ and laminellæ. This is one of the most sensitive parts of the body in domesticated animals. The old refinement of torture employed by some native tribes of inserting spikes of wood or other foreign bodies under the nails of their victims is an evidence of the pain caused thereby, and probably most of us in a small way have experienced the painful sensation of a splinter

of wood becoming inserted at that part. All animals are intensely sensitive to foot injuries; puncture of the horny wall or sole and injury to the terminal filaments of the nerves causes immediate pain and its *evidence*, lameness. The pain may pass off for some time after the primary shock to the nerve, but becomes renewed with great intensity when, as is so frequently the case, inflammatory action follows. If this proceeds to the suppurative stage, immobility may be as great as that induced by a fractured limb; the animal may refuse to put any weight upon the part, or go as lightly as possible upon the toe; or in less severe pain the foot will be lifted repeatedly from the ground with the fetlock flexed, the main weight being taken upon the sound limb. In nervous animals, shock, high pulse rate, anorexia, etc., may supervene.

The ox, which is regarded by many as a lethargic, insensitive creature, capable of bearing any amount of suffering, will evidence intense pain when the keratogenous membrane is injured by a stone or nail, or from secondary inflammatory action after a puncture. Such injuries often cause serious constitutional disturbance, especially when in the hind feet; high pulse rate, anorexia, and, if the case is of long duration, marasmus. The animal bitterly resents any operative procedure.

Sheep, with their quiet submissive ways, are generally regarded as senseless animals, indifferent to suffering; and in taking their lives for food, no attempt is made, as in the slaughter of oxen, to do it mercifully. It is a most revolting sight to witness the hurried slaughter of sheep under the system commonly in operation. This has recently been pointed out by Professor McFadyean and Dr. Fleming (*Journal of Comp. Pathology*, vol. vi., p. 346, and VETERINARY JOURNAL, vol. xxxviii., p. 98), comparing the Jewish method of slaughter with our own. Because they utter no cry, and are feeble to resist the force opposed to them, they are largely shut out of sympathetic consideration. They are, however, just as sensible to a foot injury as the most delicate human being, the most trivial injury to the nerves of the foot causing lameness, which is sometimes intense. Plugging of the interdigital space with earth, inflammation of the interungulate canal, puncture of the sole, "foot-rot," and the merciless paring away of the horn by the shepherd are all evidenced by lameness, holding up the foot, just as a horse would do in pedal pain, or hobbling on three legs; and when badly injured in both fore feet, they show their common-sense and sensibility to pain by crawling on their knees and resting thereon while seeking or taking food.

The dog and cat and other smaller animals evidence pain with equal severity in foot injuries. A thorn or flint through the plantar cushion will cause lameness. A broken nail is intensely painful, and the breeds most indifferent to pain will wince, cry, or bite when it is touched or removed. Birds of various species show lameness with foot injuries, indicating thereby that they suffer pain.

Another instance of uniformity of suffering in animals may be cited in attacks of rheumatism. I have seen this disease in horses, cattle (rare), dogs and pigs. When affected, as is most frequent, in the extremities, in proportion to the severity of the attack, either animal would be unable to walk without exhibiting great pain. Either the dog or pig would cry out with agony (pain is very difficult to estimate in the pig owing to their habit of squealing). I have not known any dog able to bear the pain of rheumatism without crying when handled or made to walk over any obstacle. Pigs have to crawl about on their knees to get their food, which they do with great reluctance, which means a good deal to an animal proverbially so fond of eating.

Physiological pain, that of parturition, will show that it costs similar agony to the mother of any species to bring her offspring into the world. It is rare to find horses giving audible expression to pain by anything beyond

groaning or grunting, excepting under delirium, or perhaps strangulated or ruptured intestines, then with the terrible straining pain they force out the rectum with a great scream. Mr. Malcolm records a case where a mare gave a loud agonizing scream in rupturing the transversalis abdominis muscle while cast for an operation. (*Journal Comparative Pathology*, vol. vi.) Labour pains are short and sharp in the mare, and the expulsion of the fœtus is frequently accompanied by a scream of agony. In bovine primiparæ with normal labour, or in older animals with dystokia, parturition is often accompanied with distressing bellowing and moaning more pronounced than in any other form of pain. The bitch and cat often cry severely in labour, especially in dystokia.

Dentition, another example of physiological pain in youth, is equally patent in all "babies." The old riddle, "name a place for everything?" and its answer, "a baby's mouth," well illustrates our infantine pains in that direction. Nearly all domestic animals (excepting the calf), during the eruption of their teeth, bite and gnaw anything and everything with which they come in contact, affording evidence of the slow gnawing pain experienced.

One other example of uniformity in structure and sensibility may be noted as having a very wide application, viz., the eye. This organ in Mammifers and Birds conforms anatomically and physiologically, subject to a few minor modifications, to a common type, being equally beautiful, perfect, and alike in all species painfully sensitive to the slightest injury. Before the days of cocaine, many veterinarians know what pain it has cost a bullock to get an embedded oat-glume removed from its cornea. The tissue reactions to injuries are almost identical in any species, and the pain equally manifest in all. Three cases of ruptured eyeball in the horse have recently come under notice. In one case extirpation of the eye was performed, and little subsequent pain was experienced when the parts were dressed. In the other two in which the wounds in cornea healed well, they were intensely painful, the animals shrinking from the slightest touch.

We have considered some of the evidences of sensibility to pain common to the most of the higher animals associated with man, and will now look at the manifestations of pain in different species attacked by some specific disease common to all. Tetanus—an intensely painful malady—will well illustrate this point. This disease in an acute form causes most intense suffering in the horse. Great nervous excitement, profuse diaphoresis, rigid spasm of the muscles, and an expression indicating great agony. An attack equally acute in the ox or dog would cause much less nervous excitement, although the contraction of the muscles might be equally severe. I saw a case a few weeks ago in a dog, where the body in every part was as hard and rigid as a frozen carcass. The animal lay for about a week on its side unable to stand, with all the legs extended and the toes drawn up and flexed under the plantar cushions. It could be handled and carried about without producing any intensification of the symptoms—and ultimately made a good recovery.

Rabies, again, causes far more intense suffering in the horse than in any other animal in which I have witnessed that malady. In no other species is the hyperæsthesis in the bitten limb so intense or strangely manifested, and the death struggles make a lasting impression on anyone who has witnessed them.

Pain in organic diseases is also very differently exhibited. The horse is utterly unable to bear with fortitude any form of abdominal pain associated with spasm of the involuntary muscles or inflammatory action. Gastritis, enteritis, peritonitis, rupture, torsion, stricture, impacted calculus, etc., are all expressed by diaphoresis, scraping, rolling, kicking, wandering, repeatedly getting up and down. This will continue hour after hour with scarcely any

intermission and is comparatively little influenced even by large doses of sedatives. A dog with enteritis will lie prostrated for hours together and, excepting by an occasional cry or sigh and a facial expression of great sadness, will scarcely evidence to an ordinary observer that it is bearing pain. Cattle bear gastro-enteric pain generally much better than horses; they may evidence suffering by moaning, grunting, or occasionally kicking at the abdomen; they will retain one position for some hours at a time.

Most animals bear pulmonary diseases well, *i.e.*, without much external evidence of suffering beyond a facial expression of sadness, turning out the elbows, groaning when made to move or on being pressed upon the sides. Great constitutional disturbance, however, accompanies nearly all chest diseases, out of all proportion to the general symptoms manifested.

Acute mammitis causes more intense pain and constitutional disturbance in the cow than any other disease, which is probably explained by the anatomical and physiological conditions.

Organs possessing dense fibrous coverings, such as the eye or testicle, are intensely painful when injured or inflamed. Orchitis is, I think, about equally painful to all species affected with it. Few, if any, animals can bear pressure upon such organs even in a physiological condition without resenting or trying to escape the pain.

Severe accidents have sometimes been chosen to show the apparent immunity of animals to pain. The behaviour of an individual in a specific case has been taken as representative of the species under all conditions. Mr. Rowell in his "Essay on the Beneficent Distribution of the sense of Pain in the lower Animals," describes a "case of a post horse which was running between Botley and Evesham, when it came down with such violence that the skin and sinews of both the fore fetlock joints were so cut that on its rising the bones came through the skin and the feet turned up at the back of the legs, the animal walking on the ends of the leg bones. It was placed in a field till permission was obtained for having it shot, and the next morning it was found quietly grazing, with the feet and skin forced some distance up the leg bones." Another quotation from the same article—"a horse, feeding by the side of the road on Headington Hill, Oxford, had its leg broken by a coach wheel passing over it just above the fetlock-joint; the bone was dreadfully crushed, and protruded in parts through the skin. Within a few minutes the horse had hobbled to the side of the road and begun grazing, showing no other sign of pain than holding up the injured leg." In the first case quoted the animal had probably been "unnerved" and did not suffer any pain. In the latter case it is difficult to see how the horse could have behaved differently. It is well known that for some hours after a crushing accident there is little pain experienced. A case is recorded where an officer during a battle had one arm and a part of the other hand carried away by a shell and did not know it until his attention was directed to himself by his soldiers.

I saw a man a short time ago who had a few days before sustained a bad compound fracture of the humerus, the bone pierced the skin and penetrated the turf on which the fall took place. In answer to a question if the pain was great at the time of the accident he answered that "the sensation was more disgusting than painful." He was a powerful athletic man and could bear pain splendidly yet, poor fellow, he suffered great agony in his death struggles with tetanus, which supervened a few days after.

Two years ago I was in a bad railway accident in Switzerland; fourteen people were killed and many injured. On the bank sitting side by side were a man and his little boy with their fractured legs in temporary newspaper splints; beyond pale faces they showed no evidence that they were suffering pain. Could such evidence be taken to prove that fractured limbs cause no pain in man?

Dr Collier in his article before quoted says : " Another proof that animals are less sensitive to pain than man is their comparative freedom from shock after severe injuries." Most pronounced symptoms of shock often follow severe injuries accompanied by fright both in dogs and horses. He further supports his theory of the immunity of the "lower animals" from pain by illustrating their behaviour when trapped, and says: " All wild animals struggle under restraint." With many, cries indicate fear rather than pain. A hare when shot rarely cries, when closely pursued by dogs it often does. Animals when trapped rarely cry until someone approaches the trap."

If the development of the nervous system is any criterion a rabbit is well equipped to appreciate pain. The brain weight has been given. The nerve endings have probably been more studied in that animal than in any owing to its extensive use for physiological experiments. In the cornea they consist of a superficial intra-epithelial network of non-medullated nerve fibres, with sub-epithelial nerve plexus from which branch 'the coarse non-medullated nerve trunks and their small bundles of non-medullated nerve fibres. In the mucous membrane of the vagina are shown plexuses of non-medullated nerve fibres surrounding the bundles of non-striated muscular fibres. In all experimental work upon this animal careful instructions are given for producing anæsthesia, which is conclusive evidence that physiologists know that rabbits are capable of suffering pain.

That fright will triumph over pain and enable an animal to do that which would be impossible to it in its quiet moments is clearly proved. This applies to man equally with other animals. The same may be said of other forms of emotion, viz., anger or excitement.

Some horses becoming fixed aud frightened will tear themselves free at any cost. In this way nostrils, eyelids, and hoofs are torn off, but suffering follows after excitement passes off. A rat or rabbit in their fright to escape from the trap must pay a bitter penalty for biting or tearing away from the imprisoned limb. Rabbits are sensible to the prick of a needle or lancet, why not to the teeth of a trap or dog ? If fright will enable them to tear their limbs from their body, what shall be said for the agents of its production ? In diseases such as gregarinosis or tuberculosis they show loss of vivacity, lassitnde, anorexia, and marasmus, etc.

A most remarkable diversity of pain-bearing power, or "insensibility to pain," is manifested in dogs. Some, after a severe accident, producing a badly fractured limb, will submit, without a wince or cry, to its being examined, set, and bandaged, or to a wound being sewn up. Others howl, cry, and struggle to escape, and nothing can be properly done to them without an anæsthetic. As is well known, some breeds possess great courage and indifference to suffering, but this applies frequently to animals of the same breed, which renders it difficult of explanation if cultivation and development of the temporo-sphenoidal lobes alone confer the faculty of perception, especially with reference to pain.

All the domestic animals, including birds, are capable of expressing various forms of emotion, viz., anger, pleasure, disappointment, sorrow, affection, attention, etc. The countenance of a horse, cow, sheep, dog, or cat may indicate many of the foregoing conditions, in addition to that of pain, and can be read by any one familiar with them. Pain is expressed by animals of the same species very much in the same way. In addition to facial expression, attitude of the body or limbs, crying, groaning, or grunting, flinching or kicking, on pressure to the painful part, or on being compelled to move so as to impart pressure to it. The eyes are the chief organs of expression, aided by the ears, upper lip, and voice. Sick animals rapidly become dejected and indicate a loss of spirits, which quickly revive under the stimulating return of health. They are influenced by external conditions also, such as light, warmth, com-

panionship, etc., of which there are innumerable illustrations. Sick animals almost invariably isolate themselves, but are deeply anxious for their companions when pain passes away, and if this is denied them convalescence is often retarded.

Animals, for the most part, love sunshine, light, or warmth of any kind, and delight to bask in it; they, with us, also quickly appreciate the stage at which sunshine passes from the pleasant to the intolerable, and seek the welcome shade of buildings or trees, not only to escape the sun but the attacks of insects, to whom heat is life and cold inertia or death.

Passing to the lower vertebrates it is much more difficult to estimate their appreciation of pain. It is, however, clearly proved that the frog, with its beauifully developed nervous system (*Atlas of Biology—Howes*), is sensible to pain, and it is only reasonable to conclude that fish, in which the nervous system is, comparatively with lower orders, highly developed, although the brain is small in comparison to body, also feel pain, as they exhibit a very keen perception in many ways. Many species in invertebrata possess a very rich ganglionic system which confers upon them a certain amount of intelligence. Earth-worms are keenly alive to approaching danger. After a storm on a summer's evening they get on to the surface of the ground, but upon the approach of a person they withdraw into the earth with very great rapidity. The optic tentacles of the snail are intensely sensitive.

The most remarkable animals, however, in invertebrata are to be found in sub-kingdom seven—*Arthropoda*, Class IV.—*Insecta*—Order XIII. *Hymenoptera*, which include the well-known ants and bees. Professor Macalister says:—"In these the intelligence of the class culminates. The ants are probably the most intelligent of insects, having the most complete nervous system in proportion to their size of any invertebrate; in intelligence and in interest they may be looked on as bearing to the other invertebrates something of the relation which man has to his neighbouring vertebrates."

The nervous system of insects consists of a central double nerve cord with a complex nerve ganglion in the head, and ganglia in all the segments backwards, the eyes and antennæ are supplied with branches from the head, the thoracic ganglia supplying the limbs, etc.

Solomon says of the ants (Proverbs vi. 6, 7, 8.)—"The ant . , . . having no guide, overseer or ruler, provideth her meat in the summer and gathereth her food in the harvest." He thus gives them credit for a high intelligence.

It will be useful for an important point in the argument of this paper to look at these animals in the exhibition of this intelligence in their everyday working life as described by a great student of their habits—Sir John Lubbock—(*Beauties of Nature*). They exhibit what in ourselves would be called respect, sorrow, anger, memory, etc., and all it must be remembered without any higher nerve centre.

Sir John Lubbock says: "Working ants and bees always turn their heads towards the queen. On one occasion while moving some ants from one nest into another I unfortunately crushed the queen and killed her. The others, however, did not desert her or draw her out as they do dead workers, but on the contrary, carried her into the new nest, and subsequently into a larger one with which I supplied them, congregating round her for weeks just as if she had been alive.

"The communities of ants are sometimes 500,000 individuals, and it is a lesson to us that no one has ever yet seen a quarrel between any two ants belonging to the same community. On the other hand it must be admitted that they are in hostility, not only with most other insects, including ants of different species, but even with those of the same species if belonging to different communities. I have over and over again introduced ants from one

of my nests into another nest of the same species and they were immediately attacked, seized by a leg or an antenna and dragged out. It is evident, therefore, that the ants of each community all recognise one another, which is very remarkable. But more than this, I several times divided a nest into two halves and found that even after separation of a year and nine months they recognised one another, and were perfectly friendly, while they at once attacked ants from a different nest, although of the same species.

"To test if ants have any sign or password by which they recognise one another I made them insensible with whisky (chloroform proves fatal to them). As they would not drink it they were put into the fluid for a few moments. Twenty-five from the nest were taken and twenty-five strangers from another, each marked with a spot of paint. When all were dead drunk they were put on a table close to where the ants from one of the nests were feeding. The table was surrounded as usual with a moat of water to prevent them from straying. The ants which were feeding soon noticed the drunken ones. They seemed astonished to find their comrades in such a disgraceful condition, and as much at a loss to know what to do with their drunkards as we are. However, they carried them all away; the strangers they took to the edge of the moat and dropped into the water, while they bore their friends home into the nest, where by degrees they slept off the effects of the spirit. Thus it is evident that they know their friends even when incapable of giving any sign or password.

"If an individual ant discovers a store of food in any given place she makes it known to the others of the nest by taking them to the treasure. When we watch an anthill tenanted by thousands of industrious inhabitants, excavating chambers, forming tunnels, making roads, guarding their home, gathering food, feeding the young, tending their domestic animals,—each one fulfilling its duties industriously and without confusion—it is difficult altogether to deny them the gift of reason; and all our recent observations tend to confirm the opinion that their mental powers differ from those of men, not so much in kind as in degree."

Can it be concluded that these tiny creatures which exhibit an intelligence almost equal to that of man are incapable of appreciating pain, yet Dr. Collier in his article quoted says—"In their case (insects) the evidence of insensitiveness would appear to be overwhelming." If with such a comparatively simple nervous apparatus—without any brain equivalent to that of vertebrates, ants evince the remarkable intelligence indicated by their habits it is only reasonable to conclude that they do not escape pain, probably as real to them as any form of suffering is to a higher animal with the most complex nervous system.

An eminent authority on the habits of Bees (The Rev. W. E. Burkitt, M.A.) in reply to a communication upon the subject, says;—

"I never had any doubt about bees feeling pain as they show all visible signs of it, and I think they exhibit pleasure quite as much as anger, especially by their voices. If you prick a bee it will sting, but if you stroke it gently it shows as much satisfaction as a cat does, or if you offer them food on your hand they certainly show pleasure by the tone of their hum which is quite different to the hum which they make if you strike at them." The foregoing facts may I think be fairly taken to show that if invertebrate animals with their simple nervous system are capable of exhibiting such remarkable faculties of perception, it is unnecessary to have an exalted cultivation of the higher nerve centres in the domesticated mammifers in order that very considerable sentiency may be evidenced by them.

"The subject of pain is an awful one, and it is one with which medical men have especially to do." So thought a writer in the *Lancet* a few years ago. We started with the statement that "Pain is a vivid reality," probably

every veterinarian is of that opinion to-day, and regards it as his highest mission to stem the tide of pain, so far as lies in his power in the suffering animals committed to his care. Our professional position is one in which it behoves us to hold clear and definite and, as far as possible, uniform views as to the sensibility of animals to pain. There is an old saying that "familiarity engenders contempt," certainly familiarity with suffering has a hardening tendency, indeed it is often necessary to cultivate the steeling process in order to continue a witness of such scenes as are common to either branch of medical work. This appears to be the only explanation of the remarkable statements which appear from time to time in the professional and lay press and of the action of some members of the profession.

It is almost paradoxical to be a keen supporter of the Royal Society for the Prevention of Cruelty to Animals and a traducer of chloroform in operative surgery. Letters appear pointing out the advantage (?) of operating in the erect position for such painful surgery as orchotomy or cautery. It is admitted that such things can be done, because they *are* done, but it is a scandal to an advancing profession and humanitarian age that it should be so, for it simply means that the use of anæsthetics is ignored, the operator's time and the owner's purse are put into the scale against the animal's suffering, and of course far outweigh it.

Pardon a hypothetical digression, change the venue! A Court of Justice! an expert witness is bearing testimony to the suffering of an animal induced by the friction of the collar, on a denuded surface of skin an inch in diameter. This being the second offence, the culprit, a poor coster, is sent to prison for a week. Again the scene changes, and the expert witness is seen with whip and spur, goading a tired hunter over the heavy ground anxious to be again a "witness" but in a far more humane cause—simply the tearing of a hare limb from limb—(it is, however, well to mention that hares do not feel pain, owing to the law having classed them as game). The solicitor who assisted in the case against the coster, is also "prosecuting" in a fresh case, but this time in the bracing hill-side air in pursuit of "vermin." It has been a grand gallop—(one unfortunate mishap occurred, a horse fell at a wall and broke his fore legs just below the fetlocks, but did not seem to mind, as it was sport); after an exhausting run of one hour and ten minutes the fox was literally flayed alive, as the dogs had a quiet time before the horses—dead beaten—reached the kill. (It should be stated however, that the fox was too exhausted from the prolonged strain of the run to feel any pain). It is true though, that foxes die in considerable numbers from scabies; the prolonged attacks of the acari causing emaciation and death. The presiding magistrate who sent the coster to prison required after the stifling influence of the over-crowded court, a season of quiet relaxation in preparation for the painful duties probably in store on the following Saturday. Being a highly nervous man and intensely sensitive to pain and fatigue, angling was his favourite relaxation, and being the fortunate lessee of a good trout stream, he was enabled to enjoy the pleasure of pulling out a good round number of fish, the day following the conviction, (it should be mentioned that fish do not feel pain, the frantic efforts they make to eviscerate themselves when hooked is due to excitement, and the joy experienced in being of some service to man).

A short time since two or three undergraduates of Oxford University were fined for coursing and worrying a cat with terriers. So far as the law was concerned they committed only an error in detail. Had they chosen a rabbit instead of a cat they might have enjoyed the sport unmolested.

In the name of *sport* animals may be hunted to death, coursed for stakes, dangled on the end of a line by the throat for one hour more. Under cover of this term rabbits may be torn to pieces by dogs to gratify the uncultivated taste or sordid interests of a collier, but a very carefully guarded license is

required under the name of science in order that they may be pricked with a subcutaneous syringe, not for sport or pleasure, but possibly to save the lives of hundreds of other animals or men. If an animal is unfortunate enough to belong to any species branded as "vermin" it will receive small sympathy from its captors or destroyers—and the law is silent on its behalf. Our ideas of cruelty in this country do not seem to be based on any principle of morality, but rather upon the customs of society and the waves of public opinion. In the matter of slaughtering animals for food, size alone seems to be a claim for merciful extinction.

A very able article quite recently appeared in a London daily paper, most justly denouncing a case of gross cruelty to a donkey. It also stigmatised the conduct of some wretched, pitiless boys who had thrown a little dog down the pit of a disused mine and contrasted it with the noble heroism of two policemen who at the risk of their lives rescued the puppy. It further made the following important statements :—

"The law is curiously indifferent to sufferings inflicted upon wild animals, while it has severe statutes for the case of those who put to torture domesticated creatures like the donkey and the dog. There is need of a great awakening in the public mind upon this matter in spite of all that has been done. The efforts of the admirable Society for the Prevention of Cruelty to Animals have wrought something, and in educated quarters the growing interest in biological studies, proving how closely akin we are to the lower creation, has made sheer brutal cruelty impossible for an enlightened mind. Those who do not believe that animals have emotions and apprehensions are little acquainted with them.

Human beings have no right or claim to ask mercy from Heaven if they deny it to these inarticulate fellow-citizens of the planet, to whom they stand in the place of a providence. Our victims die, as they have lived, silent, uncomplaining; but if it be true that not a sparrow falls to the ground unregarded from on high, their wrongs and woes are all registered. These thoughts are so obvious, so natural, in presence of the deep and touching mystery of the lives imprisoned in the forms of beast and bird, of fish and reptile, that wonder and interest ought to make all men gentle to them."

The fundamental fact upon which I desire most firmly to insist is—that animals, from man down even to the invertebrata are sensible to pain, not in the same degree, but equally *real* to the individual suffering it. It must be admitted that the emotions of animals are very real to them. The pleasure of a dog at meeting its master after a period of separation, the sorrow and anxiety of a cow or ewe being separated from their young, the energy with which a hen will defend her chicks from an intruder, the cries of birds at losing their nest or eggs, the love of a cat for its old home and associations.

"*The Lancet*, Feb. 10th, 1894, contains the record of a cat's journey from London to Lincoln, 140 miles in about eight days in severely cold weather (during Dec. 1893) he arrived travel stained and rather thin, but otherwise well. The cat had been taken a month previously by train from Lincoln to Forest Hill." And many other illustrations which readily come to mind indicate their capacity both to appreciate and express, in their own way, a sense of pain.

This being so it becomes a question of how far man is justified in inflicting pain, in any degree, upon his fellow-men and animals below him, and nominally at least under his care and protection. For food it is unquestionably necessary to take the lives of animals, and as has been pointed out there is still considerable scope for the exercise of skill and mercy. In the limited cope of a brief paper such as the present it is not possible to enter into a discussion of the debatable subject of infliction of pain for purposes of scientific research, but as a profession we are very much interested in the

matter. As all so-called vivisection is conducted under anæsthesia and the whole process safeguarded by law, there is every reason to conclude that the rights of animals are not violated.

If it is justifiable to cause pain, even if brief, in destroying animals for *food*, it must be equally so to use or destroy them, even if the process caused pain, *for the preservation of life* from disease.

A widely different aspect of the question is opened up in considering the infliction of pain for the purposes of work or pleasure. A large percentage of cruelty prosecutions in this country arise out of working animals in an unfit condition (chronic lameness and skin wounds under the collar and pad are the most frequent) and such cases generally involve the poor traders, who have invested their hardly earned savings in buying the cast off slaves of the classes above them. Good work is certainly done in this direction in suppressing wanton cruelty, but poor men are sometimes unjustly fined for working animals which, although lame are not suffering pain.—Lameness may be defined as a diminished distribution of weight and force upon one or more limbs, generally, ***but not invariably***, accompanied by pain. This has been ably pointed out quite recently by Mr. Hunting in dealing with mechanical lameness.

It is not unreasonable that the question should occur, is it more criminal to cause cruelty for work than for sport? It is unquestionable that under the name of sport an enormous amount of suffering is inflicted, and strangely enough sportsmen (amongst whom are to be found some of the most noble-minded, courageous and tender of men,) are not licensed as are scientists to safe-guard their actions in the direction of cruelty, but in order that they may have free liberty to affect the slaughter of any number of animals, and enrich the coffers of the nation.

The law cares not how many rabbits go home at night with broken legs provided they are riddled with shot, but it is scrupulously careful that a rabbit shall not get an injection of anthrax virus or an electric shock. Truly the national conscience is elastic?

The next point brings the matter home to ourselves, viz., the infliction of pain in operative surgery and in the application of remedial measures for disease.

(*To be continued.*)

SOUTH DURHAM AND NORTH YORKSHIRE VETERINARY MEDICAL ASSOCIATION.

A MEETING of this Association was held in the North Eastern Hotel, Darlington, on March 9th. Mr. J. G. Deans, President, in the chair. There were also present Messrs. F. R. Stevens, W. T. Briggs, C. G. Hill, G. J. Harvey, C. T. Holmes, and W. N. Dobbing, Darlington; Jno. Nettleton and Alex. Neish, Northallerton; P. Snaith and H. H. Roberts, Bishop Auckland; G. E. Gibson, Ferryhill; and W. Awde, Stockton-on-Tees.

Apologies for non-attendance were received from the following gentlemen:—Professors Walley and Williams; Thos. Greaves and J. E. Peele.

Mr. SNAITH produced a calculus which was taken from a horse which had died from stoppage of the bowels, having been ill five or six days. It weighed 2lb. 3oz. The animal was not known to have suffered previously from colic. The bowels were the calculus was found were sacculated.

Mr. BRIGGS stated that he had taken five from an old horse, their aggregate weight being 6lb. 5oz.

Mr. DEANS related some cases of synovitis and cellulitis met with recently, and asked the opinion of the members respecting them.

Mr. BRIGGS then put the following question of which notice had been given: "Is it advisable to allow subjects which are not strictly in order to be forwarded to the various journals for publication?"

After considerable discussion, it was proposed by Mr. NEISH, seconded by Mr. ROBERTS, and carried, that all matters be sent to the journals for publication unless an objection be raised at the time.

The charges of unprofessional conduct brought by one member of the Association against another were settled amicably.

A communication having been received from the Central Veterinary Society, suggesting that the Manchester Benevolent and Defence Association should be divided into two separate associations with a view to increase its popularity and extend its membership, it was decided to take no action in the matter.

A paragraph having been read from a newspaper by the SECRETARY, stating that no veterinary surgeon had been appointed by the Board of Agriculture in the place of Professor Brown who had retired, and that Major Tennant had been appointed principal (Diseases of Animals Division).

Mr. ROBERTS proposed that this Association express its indignation at the treatment received at the hands of the President of the Board of Agriculture, in appointing a gentleman unconnected with the veterinary profession to take charge and act in the carrying out of the Contagious Diseases (Animals) Act, he not having had the requisite training for that purpose.

The PRESIDENT seconded the resolution which was carried unanimously, and it was decided to send a copy of it not only to the veterinary journals but to the *Field*, *Live Stock Journal*, and *North British Agriculturist*.

The PRESIDENT asked the permission of the members to hold the next meeting at Bishop Auckland, which was granted, and the time fixed for 3.30 p.m.

After a vote of thanks had been passed to the President for his conduct in the chair, the meeting terminated.

W. AWDE, *Hon. Sec.*

THE SCOTTISH METROPOLITAN VETERINARY MEDICAL SOCIETY.

THE annual meeting and dinner of the Scottish Metropolitan Veterinary Medical Society was held in the London Hotel, Edinburgh, March 14th, Mr. J. Hutton, F.R.C.V.S., presiding, through the indisposition of Professor Owen Williams, President of the Society.

Present:—Principal W. Williams, New Veterinary College; Professor Wm. McCall, Veterinary College, Glasgow; Richard Rutherford, F.R.C.V.S., Edinburgh; John Hutton, F.R.C.V.S., Kelso; W. D. Connochie, Selkirk James Thomson, Aberdeen; J. Cameron, Berwick-on-Tweed; Alexander Pottie, Paisley; Veterinary-Major Moore, 12th Lancers; J. Connochie, Ayton, Berwickshire; Borthwick, Jun., Kirkliston; Aitken, Jun., Dalkeith. Professors Hunter, De Jongh, and Bradley, New Veterinary College; W. Young, Esq., Editor *North British Agriculturist*. Visitors:—Messrs. W. D. Inglis, J. McArthur, J. Spruell, P. R. Simpson, T. R. Mulcahy, and J. Nuttall.

Principal WILLIAMS read a paper on "Cruelty to animals and methods for its Prevention," which was to have been given by Professor W. O. Williams. There was a difficulty, it was pointed out, in defining the difference between the necessary and the non-necessary infliction of pain. It would not be

cruel, for instance, to ride a horse to death to save one's own life, but it would be cruel to do so from mere wantonness. Again, it would be cruel to work a lame horse belonging to a wealthy owner, but would it be cruel to allow such a horse to work, if upon its exertions a family of poor people were entirely dependent for their support? He suggested that first aid instruction should be given to those who had to do with the lower animals, on the same lines, though, of course, not so elaborate, as that given at ambulance classes. The amount of ignorance displayed by a crowd standing round a fallen horse in a slippery street was wonderful, more particularly among those people who were supposed to be horsemen. He considered that the police should be instructed how to put a hopelessly injured animal out of agony, provided, of course, they had the owner's consent. Why, too, should they not have an ambulance waggon in a large city for the removal of injured animals from the streets? He concluded by commenting upon the cruelty caused by the officers of the Society for the Prevention of Cruelty to Animals insisting upon animals being taken to one particular veterinary surgeon, who perhaps lived several miles away.

Principal WILLIAMS having finished reading the paper, made a few observations on his own account. He wished to refer to a question that was coming prominently before the public at the present time, and that was the proposed Veterinary College for Ireland. He had been in Ireland lately, and he could bring before them opinions of veterinary surgeons he had met there. Not a single member of the profession had been consulted on the matter, and everyone was opposed to a college in Dublin. A college instituted on the lines proposed would be disastrous to the practitioners in Dublin. It was proposed to found it on the same lines as the London College, where, as they knew, any subscriber of two guineas could get a number of horses up to twenty treated for nothing. London was a large place, and the college did not inflict such injury on practitioners there as it might do in smaller cities. He did not object to Irishmen having a college in Dublin, but he objected to pay his share towards the foundation of an opposition shop. He contended that this proposed college was simply a sop for political purposes. He thought they should take some steps with regard to the matter.

Mr. RUTHERFORD, Edinburgh, said he cordially agreed with Professor Williams in reference to the proposed "move" in Ireland. It would be a piece of the grossest injustice to establish in Ireland or anywhere else a veterinary college to be assisted with funds from the Imperial revenue. They must bear in mind that no funds from the Imperial revenue found their way to any of the existing colleges. It was neither more nor less than subsidising a private school to compete with schools already established and doing the work of the profession well. He hoped a solid opposition would rise up and would reach the Government as to the views of the practitioners in Scotland and elsewhere on the matter. There was another point. They had no guarantee in the prospectus whether this was to be a diploma granting body or not. If £15,000 or any sum were to be given to Ireland an equal amount should in equity be given to the already existing schools in Scotland and in London. With regard to the Society for the Prevention of Cruelty to Animals, he thought it was doing a lot of good. No practitioner could say that they had not driven off the streets of Edinburgh, for instance, a large number of horses that formerly used to be seen working. There was a different state of matters now. But that was not the only form of cruelty, and they would yet have to direct their attention to a large number of others. He deprecated the officers of the Society compelling lame horses to walk to a particular veterinary surgeon for examination, no matter how far that surgeon might live from the scene of the accident. Mr. Rutherford next referred to horses meeting with accidents in the streets. Only the other night he saw a horse lying

for nearly three hours on the streets. He advocated as a remedy for such a state of matters the providing of a suitable ambulance for the removal of injured horses either by the magistrate or the Society for the Prevention of Cruelty to Animals. This Society received large subscriptions and donations. It would be a graceful act for it to pay back some of this money in the way of providing such ambulances.

Professor McCALL, Glasgow, said he had listened with great pleasure to the remarks made by Principal Williams and Mr. Rutherford. The idea of ambulance waggons for the purpose of conveying injured animals off the streets was a good one. It was sometimes, he said, difficult to say when cruelty was perpetrated. Here was a poor man with a horse, and having a wife and family depending upon his exertions. Because a superficial wound might be seen on the horse, one might say it was cruelty to work the animal. But in many such cases that horse might be better working than standing idle in the stable and being indifferently fed until the wound healed. He did not want anyone to think for one moment that the thought the lower animals should not be attended to, and that they ought to be made to work though they had sores. He only wished to point out that frequently a horse might be better working than standing idle. In regard to the Irish Veterinary College, he had not the slightest objection to a College being founded in Ireland. He was agreeable it should be founded to-morrow, providing in the founding of that institution they did no harm to existing institutions. If the Government was prepared to devote a certain sum of money for the welfare of veterinary science in Ireland, then they should be prepared to devote the same sum to Scotland and England. If that were done he had not a word of objection. He might say that it might be to him a serious matter if a college were founded and endowed in Ireland. In the Veterinary College in Glasgow there was a large proportion of Irish students. Of course if the question was one of general good he did not think that the interest of a single individual should be considered. But if the Government endowed a veterinary college in Ireland and did nothing for the profession in Scotland and England, then he thought they had adopted a very one-sided policy which could not recommend itself to any fair and unbiassed mind. If this college was founded, he hoped they would never attempt to give to it the power of granting a diploma because it would do an incalculable amount of harm. At the present moment they were in the position that the students of Edinburgh, for instance, could not turn round to the students of Glasgow and say "I belong to an institution whose prestige is greater than yours, or "My diploma carries more influence than yours." Neither could the students of London College turn round and say they possessed a greater amount of influence than the students of Edinburgh or Glasgow by virtue of the diploma they held. The diploma granted in Edinburgh or Glasgow was the same as the diploma granted in London. He believed if they polled the profession to-morrow, 90 per cent. would object to any other body than the one at present granting diplomas, and he hoped if any attempt was made to constitute a licensing body in the present case the profession would rise up against it.

Mr. THOMSON, Aberdeen, said the subject of cruelty to animals was a very large one, and had to be studied from different points of view. He thoroughly agreed with Mr. Rutherford with regard to the providing of suitable ambulances for the conveyance of injured animals off the streets, and concurred with the remarks of Principal Williams and Professor McCall in reference to the veterinary college in Ireland. If he had his way he would say centralise the colleges they had; let them have large public cliniques, and let them have their professors thoroughly subsidised from an independent source.

Mr. POTTIE, Paisley, said the Society for the Prevention of Cruelty to Animals at one time caused a good deal of ill-feeling by sometimes instituting

prosecutions when these were not required. But in this respect matters had been greatly improved. He had also seen great cruelty caused to animals by travelling them great distances to special veterinary surgeons. Frequently he had known of horses being walked all the way from Paisley to Glasgow for that purpose. With regard to the college in Ireland, he was at one with the previous speakers. He could not see why any Government should give £15,000 to Ireland and nothing to Scotland at all. That would be very unfair. As far as he knew, the profession was not actually wanting the college. They knew perfectly well that an institution of the kind required more than an endowment; it required efficient men, and, of course, students. He thought that the members should oppose the proposal.

Mr. PETER MOIR, secretary, said they had heard many very appropriate remarks regarding the question of prevention of cruelty to animals. He was of opinion that ambulance waggons for animals were as necessary as ambulance waggons for human beings, and surely they would be the means of preventing a vast amount of pain in the lower animals, for the prevention of which the society was constituted. He could not forget a scene he and Mr. Rutherford witnessed in a busy thoroughfare a short time ago. Two butchers' horses, in vans, had run into each other at a street crossing. One horse was lying, with its off fore-leg nearly severed from its body, and the scapula broken into pieces by the collision with the opposing van shaft; the other horse lay alongside, helpless from paralysis. For want of an ambulance, these animals had to lie on the streets for hours, there being no way of getting them removed. Cases of that kind were frequent in large cities like Edinburgh. The question of providing ambulances in cities was a crying one, and the suggestion of the president should be acted upon, and he thought the Society for the Prevention of Cruelty to Animals should expend part of the money so freely contributed to it, in that direction.

Mr. CAMERON, Berwick-on-Tweed, said it would be comparatively easy in large cities to get ambulances, but it was a different matter in small towns. He thought in all cases where the Society for the Prevention of Cruelty to Animals intended to prosecute, notice of their intention should be at once given to the parties interested. Sometimes weeks passed before the slightest intimation was given, and then at the last moment a summons was issued. With reference to the Irish question, or the college question, he thought it was a step in the right direction, and he certainly had no objection to it. He did not see why they should object in the slightest to Ireland getting this money. They should go in for the same thing in Scotland.

Veterinary-Major MOORE, Piershill, thought they could not have a college in Ireland unless it was worked on the same lines as the existing colleges. But putting aside the question of money, it was for the profession to be up and doing. Let them lay their views before Government, and don't let them create a college in Ireland that would give a diploma short of the diploma they had at present; otherwise it would be ruination to the profession. The suggestion for the provision of ambulance waggons was a good one, and should be largely taken up throughout the country.

Mr. CONNOCHIE, Selkirk, said if Irishmen wanted a college let them have it; but the idea of subsidising it with Government money was nonsensical. They had examples in Principal Williams and Professor McCall of what could be done unaided.

Mr. YOUNG, Dundee, said some of the things done by the Society for the Prevention of Cruelty to Animals arose through the ignorance of some of their officers. For instance, there were some cases of lameness in horses where the lameness was merely mechanical, and the animal suffered no pain. In such cases an inspector often thought that because an animal had an impediment in its walk it must necessarily be suffering pain, and a prosecution

often followed. It was necessary to differentiate between the two kinds of lameness.

Professor DE JONG, Edinburgh, said although they might have a college in Ireland students would still come over to Edinburgh and Glasgow, because these towns were famous for the teaching of veterinary science. But he would object to the proposed college being a diploma-granting body. If allowed to grant diplomas it would be ruinous to the profession, and it should be strongly opposed in every way possible.

The subject then dropped.

Mr. RUTHERFORD showed the femur of a colt, and read a letter from Mr. Inglis, Forfar, with reference to it; in this it was stated that the bone was that of a colt 2½ years old, which exhibits a fracture of the head with a considerable amount of deposit surrounding it. About 18 months ago I was called upon to see the animal, which was noticed to be a little stiff. I examined the leg, and found the animal to be much pained on pressure being applied over the hip joint. There was very little to be seen in the lameness, only a slight stiffness. I had him tied up in a stall and ordered the usual treatment of fomentations and a stimulating liniment to be applied. I called again in a few days and found him better, but still continued the liniment and rest. About a fortnight afterwards I was informed that he was stiff again. When I saw him this time I applied a good sharp blister over the hip, and after it subsided I found very little improvement. We kept him confined a long time, thinking that rest would repair the injury, but he gradually became worse. I applied several blisters and setons, but got no encouragement. He was turned out to grass, just to run and take his chance, as I informed the owner that I thought the case was incurable. About six months ago I was looking over some young stock in the same field, and when approaching this colt, he moved off slowly and I distinctly heard (for the first time) a crepitating sound. I now made up my mind that a fracture had taken place. I advised the owner to destroy him, but the animal being young he thought he would still keep him. The colt was tied up again, but got no better, and it was only about a week ago I obtained permission to destroy him. I found the fractured femur with a false joint, and the head projecting in the acetabulum so firm that we could scarcely dislodge it. The acetabulum was completely fractured, and this would account for the sharp jerking felt when the hand was placed on the anterior spine of the ilium. There was extensive atrophy of the surrounding muscles. In this case the animal was always able to place his foot on the ground and put weight on the limb.

After being examined by the members, the specimen was handed over to the charge of Professor Williams.

Principal WILLIAMS made a statement with regard to the use of moss litter for bedding purposes. The impression, he said, was growing that peat moss might contain the germ, and be a cause of tetanus. Of course, he admitted it was a splendid bedding, and he had used it largely himself.

Professor MCCALL thought they should be careful in any statements they made with regard to the matter. Speaking from his own experience in Glasgow, he was not able to say that he had traced a single case of tetanus to the peat moss.

Mr. RUTHERFORD said he had recently a bad case of tetanus from wounds on peat moss. The animal afterwards stood on sawdest, and recovered; but he would not say that proved the peat moss produced the disease. He must say, however, that there were cases in which he did not approve of moss as a bedding, and he never now permitted its use in infectious disease, because he believed, as the result of his experience clinically, that it was a suitable medium for keeping mischief about a stable. There was, of course, less risk, it might be none at all, where the moss was removed as soon as soiled. That

risk, however, he preferred to avoid in such cases, and in more than one instance he thought his caution had been rewarded.

Mr. CAMERON said he had no experience of peat moss. He had plenty of straw, and he had had plenty of tetanus.

Mr. THOMSON said he had experience of peat moss in very large stables, having used it for a number of years. He had had three cases of tetanus within a period of three months—two on moss litter and one on straw. They must really have some direct facts demonstrated unmistakeably before they denounced peat litter.

Major MOORE spoke to having had cases of tetanus where the animals had no straw, but only mother earth to lie on.

This concluded the discussion.

Mr. MOIR moved a vote of thanks to the chairman for presiding.

Professor MCCALL seconded. He was sorry to see they were asleep in Glasgow. The West of Scotland Veterinary Association had done good work at one time. Then somehow or other it went to sleep for a number of years. It had afterwards re-awakened, but it had taken another fit. He hoped his friend, Mr. Pattie, would do something to wake it up.

Mr. PATTIE said he had a suggestion, and he thought it might be taken it. He asked if there was any possibility of having the societies united. He knew a great number in the West of Scotland who would be glad to join a society of that kind. They could then hold their meetings sometimes in Glasgow and sometimes in Edinburgh.

Mr. RUTHERFORD said it had been mooted that they might move westward, but they were afraid of the susceptibilities of the western veterinary surgeons; otherwise long ere this they would have been found meeting in Glasgow.

Mr. MOIR said in sending out invitations to the meetings, he always included a large number of Glasgow veterinary surgeons, but he never received a reply. That was very discouraging. He sent out at least a hundred circulars to the profession, including the members of the society, and he only got twenty replies. Ten of these were acceptances, and ten were refusals. At the same time he would be very pleased indeed to call a meeting in Glasgow if the profession there would support them.

Principal WILLIAMS said he thought the amalgamation question was worthy of consideration.

The meeting then terminated, and the members afterwards dined together.

PETER MOIR, *Hon. Sec.*

ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

AT the Monthly Council, held on April 4th,

Mr. STANYFORTH reported that a letter had been read from Mr. Cope, tendering his resignation as a member of the Veterinary Committee. It had been resolved that Mr. Cope's resignation be accepted, with regret, together with an expression of appreciation for his past services as a member of the Committee. A letter, dated March 16th, 1894, had been read from the Central Chamber of Agriculture, inviting the Society to send representatives upon a deputation to the President of the Board of Agriculture to ask that live animals should only be allowed to be imported subject, except under very special conditions, to the invariable rule of slaughter at the port of landing. The date of the deputation having been fixed for Tuesday, April 3rd, it had not been possible for a decision to be arrived at by the Council as to whether the Society should be officially represented upon the occasion referred to; but the Council had already taken action in the direction desired by their resolution of February 1st, 1893, which had been duly communicated to the Board of Agriculture.

A second meeting of the Special Committee on Abortion in Cows had been held on the previous afternoon, when evidence had been taken from three further witnesses. The Special Committee had suggested that a leaflet should be circulated forthwith amongst stockowners, recommending the preventive treatment against epizootic abortion, which had been successfully practised by Professor Nocard, of Alfort, France, and requesting particulars of the results of the treatment from those who adopted it. It was proposed that, when the owner so desired, arrangements should be made for a veterinary surgeon to visit the farm at the cost of the Society, and to advise as to the preparation and application of the solution. The Committee recommended that the suggestion of the Special Committee should be adopted, and that a copy of the proposed leaflet should be sent with each member's copy of the new Journal, now in process of distribution. The resignation had been received of Mr. Lewis Rees as the Society's Provincial Veterinary Surgeon for Carmarthenshire, in consequence of his proceeding to Brecon, Mr. Rees at the same time applying for the vacant post of Provincial Veterinary Surgeon for Breconshire. The Committee recommended that Mr. Lewis Rees be appointed to this post, to hold office during the pleasure of the Council. An application was also received from Mr. Charles Morgan, M.R.C.V.S., applying for the post of Provincial Veterinary Surgeon for the county of Carmarthen, in succession to Mr. Rees, resigned, and the Committee recommended that he be appointed on the usual conditions.

The Committee recommended the appointment of Mr. Clement Stephenson, F.R.C.V.S., as Lecturer on Horse Shoeing at the Cambridge Meeting, on the same terms as last year.

The following report had been presented by Professor BROWN :—

Pleuro-Pneumonia.—During the four weeks ended March 24th, according to the returns published in the *London Gazette*, no case of this disease was discovered in Great Britain, but four suspected animals were slaughtered and found on *post-mortem* examination to be free from the disease.

Swine Fever.—Up to the present time there appears to be no decrease in the number of pigs dying of swine fever or slaughtered as being diseased or having been exposed to the risk of infection.

According to the *Gazette* returns, 758 pigs died of swine fever in the four weeks, 5,549 were slaughtered either as diseased or in-contact animals, and sixty-eight suspected swine were slaughtered, but found on *post-mortem* to be free from swine fever.

Anthrax.—From the recently published returns, anthrax still maintains its higher rate of prevalence this year as compared with previous years. There were fifty-seven fresh outbreaks in four weeks, and ninety-nine animals attacked, as compared with thirty-four outbreaks and sixty-two animals attacked in 1893, and nineteen outbreaks and twenty-eight animals attacked in 1892.

Glanders (*including Farcy*).—The returns relating to these still continue below the average of the past two or three years. There have been 79 fresh outbreaks this year in the four weeks, and 104 horses attacked, as compared with 107 outbreaks and 177 horses attacked in the corresponding period of last year.

Rabies.—There have been nine cases of this disease reported in four weeks in the counties of Cornwall, Lancaster, York (W.R.), and Lanark.

Abortion in Cattle.

Colonel CURTIS-HAYWARD said he was unfortunately unable to be present at the meeting of the Special Committee on Abortion in Cattle last Monday, but he suggested that before the leaflet was issued the Society should make

an addition to it. They would be recognising, by the issue of that leaflet, that there was a presumption in favour of the disease being infectious, while apparently it suggested no precautions to be taken in regard to the aborted fœtus. In his part of the country it was the practice to put the fruits of the abortion upon the nearest dung-heap. He had a letter from a gentleman in Somersetshire to say that in his country it was the custom to simply leave the fœtus in the field to rot and to pollute the air. If an infectious disease was the source of abortion, he would like to suggest an addition to the effect that special precautions should be taken with the fœtus, and, if possible, to say that it should be burned.

Professor BROWN said the precaution Colonel Curtis-Hayward suggested was so perfectly obvious that it had not occurred to any member of the committee to advise it. There was, of course, no objection to the proposed addition if it was thought desirable. If it was true that the practice still continued of allowing the fœtus to lie rotting in the field, then it certainly would be advisable to add some suggestion as to the immediate and proper disposal of the aborted fœtus and the disinfection of the premises.

The Hon. C. T. PARKER considered it would be most desirable to have the addition made to the leaflet, because he knew that the practice of a great many farmers that he had seen was to throw the fœtus of cows that had aborted on to the dung heap, where they were allowed to lie in all stages of putrefaction.

Mr. PELL thought it was universally known that every precaution should be taken in regard to animals that had slipped their young, and as to the premises in which the accident happened. He therefore hoped that if any suggestions were made to farmers and agriculturists generally it would be explained that they were made in consequence of local ignorance or misconception on the subject; otherwise it might be taken as an extraordinary piece of advice coming from that Society.

Sir NIGEL KINGSCOTE said that the evidence already taken before the Special Committee had been most strongly to the effect that the disease was very infectious, and he could not help thinking, therefore, that the suggested addition was most desirable.

After further discussion, it was arranged that an addition to the circular, drawn up by Professor Brown, should be made in accordance with Colonel Curtis-Hayward s suggestion, and the issue of the leaflet was accordingly authorised in the following form :—

Prevention of Epizootic Abortion in Cows.

From the evidence which has recently been brought to the notice of the Society, it is considered desirable to recommend to the special attention of stockowners in whose herds abortion has appeared the system of preventive treatment, which is described in the following quotation from the article on abortion in the Society's Journal, Vol. II., Part IV., 1891, page 738 :—

"The plan which Professor Nocard recommends to be used in cow-sheds and premises in which epizootic abortion occurs year by year is the following :

"1. Every week the places in which cows are kept must be well cleansed, and especially the part behind the cows, and then disinfected by a strong solution of sulphate of copper (blue vitriol), or a solution of carbolic acid, one to fifty of water.

"2. The under part of the tail, the anus, vulva, and parts below of all the cows must be sponged daily with the following lotion, which is a strong poison :

Rain water or distilled water	2 gallons
Corrosive sublimate	2½ drachms
Hydrochloric acid	2½ ounces

"During the first season of this treatment only a moderate amount of improvement is to be expected, but after the next season abortion will cease entirely."

It would very much assist the Society in their inquiry if members of the Society whose herds have been affected by abortion would inform the Secretary at once if they propose to adopt this system of treatment in their herds; and, afterwards, if they would send to him particulars of the results of the treatment. When the owner desires it, arrangements will be made for a veterinary surgeon to visit the farm at the cost of the Society, and to advise as to the preparation and application of the solution.

It appears that in some districts no precautions are taken to destroy the fœtus after abortion. This should be done *without delay in every case*, by burning or burial in quicklime. The latter should also be freely scattered over the ground contaminated with the discharge.

McGILL UNIVERSITY, MONTREAL.

Faculty of Comparative Medicine and Veterinary Science.

THE last session of this Veterinary Faculty in connection with the McGill University, commenced on October 1st, and terminated on March 30th, which, being Convocation day, was devoted to conferring degrees.

Mr. J. H. R. Molon presided, and accompanying him upon the platform were Dr. Johnson, vice-principal of the university; Sir William Dawson, Dr. D. McEachran, dean of the faculty of comparative medicine and veterinary science; Rev. Dr. Cornish, Rev. Dr. Barbour, Mr. W. C. McDonald, Mr. S. Finley, Profs. Girdwood, Wesley Mills, Penhallow, Baker, Wilkins, Chas. McEachran, Adami, Dr. Deeks, Dr. Gadsden, of Philadelphia; Dr. Bryden, of Boston, and Mr. J. W. Brakenridge, acting secretary.

Rev. Dr. Cornish opened the proceedings with prayer, after which Dean McEachran, read the faculty lists, showing that the number of students who registered for the session, which opened on October 1st last, was 53, of whom 48 attended the full course, viz., from the United States, 17; Canada, 33; England, 2; Hawaiian Islands, 1.

The prizes and honors won by the students were then awarded as under, followed by the dean presenting the candidates for the degree of D.V.S., the oath in connection with which was administered by Mr. J. W. Brakenridge, whilst the "capping" was done by Dr. Johnson, and the diplomas were presented by Prof. Chas. Eachran.

Prizes.

Veterinary medicine and surgery—Cecil French.
Anatomy—J. C. Hargrave.
Cattle pathology—Cecil French.
Cynology—A. E. Moore.
Zoology—H. Dell.
Chemistry—J. C. Hargrave.
Physiology—J. C. Hargrave.
For the best general examination in all snbjects—Cecil French.

Scholarships.

For the highest aggregrate obtained in first year subjects ($50)—Harri Dell.

For the highest aggregate obtained in second year subjects ($50)—J. C. Hargrave.

Extra Prizes.

For the best essay read before the Veterinary Medical Association—Cecil French, 1; A. E. Moore, 2; C. J. Mulvey, 3.

For the best essay read before the Society for the Study of Comparative Psychology—A. E. Moore, 1; J. A. Buchan, 2; J. H. McLeod, 3; next in order of merit, J. V. Solandt.

Candidates for the Degree of D.V.S.

B. Anderson, G. P. Baker, J. A. Buchan, A. G. Cannon, E. J. Cary, H. R. Cleveland, Cecil French, R. H. Grattan, A. H. Hall, D. McAlpine, J. D. McGillivray, J. H. McLeod, A. E. Moore, C. J. Mulvey, I. L. Salley, J. R. Shaw, J. V. Solandt, R. Thomas, J. F. Walsh, Scott.

Dean McEachran read the annual report on the examinations. The duties of the session, he said, had been carried out by professors and students in a satisfactory manner, and he was confident that those who had that day gone up for their degrees would do credit to the college; they, at least, compared favourably with the graduates of any other English speaking veterinary school. After briefly referring to some of the branches in which progress had been made in veterinary science during the past year, he went on to say that in the session just ended, much had been done by all the teaching staff to inculcate a true appreciation of the importance of acquiring a thoroughly scientific knowledge of medical science. They had endeavoured to instil into the minds of the students a detestation of cruelty, and Prof. Mills especially had done good work in teaching them to study and carefully investigate the psychological development of the domestic animals. Thus they hoped to accomplish their chief object—to improve the condition in health and disease of those animals which served so useful a purpose, and added so much to the comfort and pleasure of man, and also to educate the students in the matter of preventing and intelligently treating those diseases which affect those animals used for food, and which are prone to communicate to the human family the diseases by which they are affected. He touched upon the wide scope which the veterinary field offered, assured the newly-fledged graduates that they carried with them the best wishes of their teachers and their alma mater, and concluded by thanking those gentlemen who had come long distances, some from Philadelphia and Boston, to assist in forming the examining board.

The valedictory address was delivered by Dr. CECIL FRENCH, who suggested a higher standard for matriculation, and spoke a kind word for each of the professors.

Dr. GIRDWOOD, on behalf of the professorial staff, spoke words of congratulation to the members of the graduating class and wished them God-speed. He took a brief retrospect of the history of the veterinary college and showed the progress it had made since it was started by Dr. D. McEachran twenty-eight years ago. The position which it has attained, however, could only be maintained by constant and continued work on the part of all. One of the matters which the teaching staff desired to see was the raising of the standard of preliminary education, by which the minds of the students would come to the college better prepared to imbibe the instruction given them. In conclusion, he assured the graduates that whenever they wanted a friend or advice the members of the teaching staff would always be ready to give them assistance.

Dr. GADSDEN, one of the Board of Examiners, said that he had assisted at the examinations of the college for ten years, and each year with a higher appreciation of the character of the teaching conducted by the faculty. He had had thirty-five years' experience as a practitioner of veterinary science, and had had every opportunity of observing its rise and progress both in England and throughout the continent of America, and he paid no empty compliment to the Montreal School when he said that it had been an important

factor in that progress. He hoped that the day was not far distant when the teaching staff, all the members of which were men who did honest work, not for pecuniary gain, but for pure love of the work, would be provided with the necessary facilities for carrying on their work under more favourable conditions than they at present enjoyed.

Sir WILLIAM DAWSON said that he had taken an interest in the veterinary college from the first, not merely because he saw that Dr. D. McEachran and his colleagues were the right men in the right place, and because he sympathised with their arduous efforts in a worthy cause, but because of the object itself. The wealth, and even the subsistence, of the people of this country depended so much on our live stock that everything which tended to bring the appliances of modern science to bear on its improvement and exemption from epidemic disease was of the highest national importance, and nothing could conduce to this more than the thorough training of our veterinary surgeons and physicians. The importance of this had often been brought under the notice of the Government and the people in recent years. Every lover of his country should sympathise with and aid the good work being done by the faculty of veterinary science and comparative medicine, and its graduates should be held to occupy a high place in professional standing.

After a few remarks from Dr. JOHNSON, Rev. Dr. BARBER pronounced the benediction, and the proceedings were at an end.

ONTARIO VETERINARY COLLEGE.

THE Spring Examinations at this largely-attended and successful institution, have been in progress since the beginning of March. The Honour Examinations being the first held, were concluded about the 20th. The Government Board of Examiners then met to conduct the qualifying examination. During five days these gentlemen sat, and thoroughly examined a large number of applicants for the diploma. At the conclusion of their labours, it was found that 140 gentlemen had succeeded in passing the examinations. In order to award to these gentlemen the diplomas they had so well earned, and to present the prizes and honours carried off by many of them, a public meeting was held in the large Lecture Hall of the College. In addition to the large graduating class, many other students and friends attended. Professor Andrew Smith, F.R.C.V.S., Principal of the College, presided, and upon the platform were the mayor of the city of Toronto, Professor Cavan, Principal of Knox College, J. J. Withrow, President of the Toronto Industrial Exhibition Association, Mr. J. Millar, Deputy Minister of Education, Dr. May, representing the Minister of Agriculture, J. L. Hughes, Public School Inspector; Dr. Thorburn, Dr. J. T. Duncan, Dr. C. H. Sweetapple; H. J. Hill, Manager Industrial Association, Henry Wade, Secretary Agriculture and Arts Association of Ontario; Rev. C. Campbell, William Cowan, Galt, Wm. Burns, President Ontario Veterinary Association, John Akers, and others.

The proceedings opened with a few words of welcome from the chairman, who spoke in most gratifying terms of the continued success of the college, after which a letter of apology for enforced absence was read from the Lieutenant-Governor, who was prevented from being present through domestic bereavement.

The prizes and diplomas were then distributed, and at the conclusion of the distribution, several of the gentlemen on the platform delivered brief addresses to the students.

Mayor KENNEDY opened with a felicitous speech, in which he congratulated the college and the students upon the conclusion of another successful year in the history of the institution. He commented upon the large number of

students present from the United States, British Columbia, the North-west, and many other distant parts, and declared that this was a strong testimonial to the wide reputation and thorough work of the college. Many present were leaving college to begin life, but he urged them never to give up study, but to continue to the end with the same thorough whole-heartedness that they had conducted their work during their term at the college.

Principal CAVEN added his meed of congratulation, and endorsed the mayor's remarks upon the necessity and value of continuous study. This, he declared, was not only a necessity, but the highest joy. The best moral attainments were nearly always found alongside of the best intellectual attainments; a good student was nearly always a good man. He was satisfied the students before them would do all in their power to elevate and advance their chosen profession.

Public School Inspector J. L. HUGHES advised the students to not only keep up with the latest developments in their own profession, but also branch out into other departments. He reiterated and endorsed Henry Irving's advice to the students at Harvard, to nurture and develop their individualism. There was a great personal responsibility attaching to each of them; a responsibility to themselves, their college, their parents, their neighbours, their country and their God.

Mr. J. J. WITHROW, President of the Toronto Industrial Exhibition Association, was the next speaker, and he was followed by Mr. Millar, Deputy Minister of Education; Dr. Thorburn, Mr. Cowan and Mr. Burns.

Before the meeting dispersed a pleasant incident occurred, when Mr. Blackwell, of Washington Territory, one of the year's graduates, rose in the body of the hall, and in appropriate and appreciative terms presented Professor Smith, in the name of the 1894 class, with a large and excellent photograph of the graduates. The group contained about 170 likenesses, and was handsomely mounted and framed.

Professor SMITH acknowledged the gift feelingly, and referred in kindly terms to the good work and high standard of discipline which had characterized the year.

Notes and News.

A FAMILY KILLED BY TRICHINÆ.—A family of seven persons have died at Algiers from the effects of eating pork infected with trichinæ. Several neighbours, to whom portions of the same animal were sold, are seriously ill.

TUBERCULOSIS IN THE UNITED STATES OF AMERICA.—The State Board of Health of Pennsylvania, reports that tuberculosis amongst cattle no longer exists within the borders of the State, all infected animals having been destroyed.

HORSEFLESH IN VIENNA.—The consumption of horseflesh in Vienna increases in a most remarkable manner. The number of horses slaughtered in 1893 amounted to 18,209 head, or 4,869 more than in the three towns of Berlin, Breslau, and Hamburg.

PROFESSOR DAMMANN.—Privy government councillor, Professor Dr. Dammann, director of the Veterinary High School at Hanover, recently celebrated his 25th anniversary as professor. He was teacher at Bostock and Eldena for eight years, and was appointed to the directorship in 1877.

VETERINARY SURGEONS IN THE TURKISH ARMY.—In the Imperial Ottoman Army there are 174 veterinary officers apportioned as follows, according to their relative rank:—2 Brigadier Generals; 18 Colonels; 21 Lieutenant-Colonels; 50 Commandants; 26 Adjutant Majors; 48 Captains; 9 Lieutenants, who must have studied for five years in the Superior Veterinary School.

ESTABLISHMENT OF A VETERINARY SCHOOL IN EGYPT.—Lord Cromer, the English Consul-General in Egypt, in his report for 1893, mentions that provision has been made for creating a Veterinary School in connection with the School of Medicine at Cairo, and he expresses the hope that students will come forward, as the supply of Egyptian Veterinary Surgeons is almost exhausted.

HORSEFLESH FROM AMERICA.—The State Veterinarian of Montana, U.S.A., has recommended the establishment of abattoirs and the slaughtering of horses as the most feasible means of getting rid of the surplus equine product of that commonwealth. He thinks that horse meat could be exported to Europe and there sold at a profit, while the bones, hoofs, and tallow could be disposed of in the home market.

AN EPIDEMIC OF TRICHINOSIS.—According to Ostertag's *Zeitschrift für Fleisch und Milchhygiene*, the general sanitary report for the kingdom of Bavaria, from 1880 to 1890, shows there were forty-three persons affected with trichinosis, but only two of them died. At Frendenthal, Austria, more than fifty people were dangerously infested with trichinæ through eating sausages made from trichinous pork. It is remarked that there is no special inspection of such flesh in Austria, as there is in most other parts of Germany.

A DISTINGUISHED VETERINARY SURGEON.—The *Recueil de Méd. Vétérinaire* for April 15th, states that the medical journals of Paris announce the election of Dr. Raymond by the Faculty of Paris, by 30 votes out of 32 voting, to succeed the late Professor Charcot in the clinical chair for nervous diseases at the Salpetrière Hospital. Dr. Raymond was already a physician at that establishment, as well as *agrégé* of the Faculty; he is also a member of the veterinary profession, having studied at the Alfort School, and obtained his diploma in 1865. After passing a year at the Saumur Cavalry School, he was successful in the competition for the post of *Chef de Service* for anatomy and physiology, but only held it for a year, when he commenced to study human medicine, and with such brilliant results that he has been deemed worthy to succeed such a renowned pathologist as Charcot. The Alfort School could already boast of one of its students being among the Professor of the Faculty of Medicine, Dr. Terrier having been recently installed in the chair of Operative Surgery.

THE COLUMBACZ FLY.—In Neumann's "Parasites of the Domesticated Animals" (English edition), special allusion is made to the damage perpetrated by this fly in certain parts of Europe. In a note recently published in *Progrès Vétérinaire*, and noticed in the *Recueil de Méd. Vétérinaire* for April, Boyadjïev reports that the bites or punctures ot the Simulium of Kolumbacz or Goloubatz, caused enormous ravages in 1892, in the department of Vidin, Bulgaria. Of 36,757 head of cattle in that locality, there perished 534; of 1,703 buffaloes, 220 died; of 9,148 horses, 52 were lost; of 220,997 sheep, 243 succumbed; of 46,923 goats, 446 also died; as did 217 pigs of 25,034. As will be observed, the buffaloes suffered most, as the mortality among them was 13 per cent., while among the cattle it was only 1·45 per cent. To prevent the attacks of these small but most virulent flies, Boyadjïev recommends smearing the bodies of animals, before sending them out to work or to graze, with bitter and odoriferous substances, such as a decoction of walnut or wormwood leaves, mixed with tar water or petroleum.

THE PASTEUR INSTITUTE.—The current issue of the *Annales de l'Institut Pasteur* gives a full return of the work done there last year. It appears that 1,648 persons were under treatment and that six deaths occurred. But in two cases the first symptoms of hydrophobia appeared before the treatment had been completed, so that they cannot fairly be included in the rate of mortality,

the decrease in which, since M. Pasteur began his treatment eight years ago, is well shown in the following table :—

Year.	Number of Persons Treated.	Number of Deaths.	Rate of Mortality.
1886 ..	2,671	25	·94 p.c.
1887 ..	1,770	14	·79 p.c.
1888 ..	1,622	9	·55 p.c.
1889 ..	1,830	7	·38 p.c.
1890 ..	1,540	5	·32 p.c.
1891 ..	1,559	4	·25 p.c.
1892 ..	1,790	4	·22 p.c.
1893 ..	1,648	4	·24 p.c.
	14,430	72	·50 p.c.

Out of this total of 14,430 persons treated since the institute opened, 1,213 were bitten in the head, the number of deaths being 16, or 1·32 per cent.; 8,032 on the hands, the number of deaths being 45, or ·56 per cent.; and 5,185 on other parts of the body, the number of deaths being 11, or ·21 per cent. The 1,648 persons inoculated last year were made up of 1,470 French and 178 foreigners, the latter including 43 Spaniards, 35 Greeks, 23 English, 22 Belgians, 18 Egyptians, and 14 subjects of the Queen from India.

Communications, Books, Journals, etc., Received.

COMMUNICATIONS have been received from J. Moir, Edinburgh; E. Wallis Hoare, Cork; Messrs. Arnold and Sons, London; D. McEachran, Montreal; S. Radlauer, Berlin; T. Christy and Co., London: Vinton and Co., London; Dr. Duncan, Toronto; A. H. Gray, London; A. Green, Dudley; A. W. Hill, London; W. Awde, Stockton-on-Tees; G. Thatcher, London; Professor Law, Ithaca, U.S.A; V. S. Desmond, Warrnambool, Australia.

BOOKS AND PAMPHLETS: Report of the London Model Abattoir Society; Powers of the Local Authorities; *M. Kostoff*, Sulla Diagnosi della Morva Equina; Johns Hopkins Hospital Reports; *W. Dickerhoff*, Lehrbuch der Speciellen, Pathologie und Therapie für Thierärzte; *M. Clement Teyssandier*, Etude Comparée sur la Pathogénie du Tétanos; Bulletin de la Société Royal Protective des Animaux de Belgique; *James Law*, Tuberculosis in Relation to Animal Industry and Public Health; Procès-Verbal de l'Académie Royale de Médecine de Belgique; *J. T. Duncan, M.D.*, Shall the Term, Auto-Infection be Retained?

JOURNALS, ETC.: *Journal of the Royal Agricultural Society of England; Live Stock Journal; Annales de Médecine Vétérinaire; British Medical Journal; Revue Vétérinaire; Thierarzt; Lancet; Recueil de Médecine Vétérinaire; Presse Vétérinaire; Ctinica Veterinaria; Cape of Good Hope Agricultural Journal; American Veterinary Review; Our Animal Friends; Journal de Médecine Vétérinaire et de Zootechnie; Echo Veterinaire; Deutsche Zeitschrift für Thiermedicin und Vergleichende Pathologie; Schweizer Archiv für Thierheilkunde; Repertoire de Police Sanitaire Veterinaire et d'Hygiene Publique; Edinburgh Medical Journal; Mark Lane Express; Journal of the Royal United Service Institution; Veterinarian; North British Agricultur st; Œsterreichische Zeitschrift für Wissenschaftliche Veterinärkunde; Archiv für Wissenschaftliche und Praktische Thierheilkunde.*

NEWSPAPERS: *Colorado Farmer; Montreal Gazette; Wynberg (South African) Times; Edinburgh Evening Dispatch; Glasgow Herald; City Times.*